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Gas Education An Urgent Necessity

Speakers at Second General Session Would "Tell the Story" to Public, Employes and Colleges

Technical education in every field of the gas industry, and in fact, in human endeavor generally was featured in the second general session of the American Gas Association on the far end of the Pier on Wednesday morning. Both company employes and college students were dealt with directly in papers on the educational side, and indirectly, the entire gas industry's education to its own opportunities came in for consideration in other talks.

Thus, it was pointed out that gas for house heating not only resulted in greater comfort for the householder, but is far more healthful than any other fuel. This point was made by Charles A. Munroe, chairman of the Board of the Laclede Gas Light Company, of St. Louis, past president of the A. G. A.

House Heating

"The potential volume of house heating gas business is from five to fifteen times the present volume," Mr. Monroe said. "This means that upward of one and one-half trillion cubic feet of manufactured gas, which would produce more than $1,250,000,000 in revenue would be required annually for house heating, but before the house heating business approaches this magnitude the public will have to be educated over a period of years to the advantages of gas as a house heating fuel. At the present time such business can be obtained only by intensive sales efforts."

Much of Mr. Munroe's talk and analysis he illustrated with graphs and statistical tables and other illustrations based on experiments conducted by his company in this regard and his information came as news of a most interesting sort to the many gas men assembled.

Education of Employes

The education of employes was taken up by P. J. Mullaney, of the People's Gas Light & Coke Co., Chicago, chairman of the Education of Gas Company Employes Committee. Five booklets on the industry are the program of the committee. One of these is now ready for distribution, and the second is in the hands of the printer. The third is about ready to go into print and the fourth and fifth are being prepared. The first takes up the origin, history and development of the industry, Mr. Mullaney told the session. The others are titled, in order: The Story of Gas Manufacture, The Story of Gas Distribution, The Story of Gas Utilization, and The Story of Gas Service.

The study of these five books by the employes of the gas industry will lead to a fairly complete knowledge of the gas industry, the speaker pointed out, at least to such an extent as to make every employe aware of his function and the functions of his fellows in the work they are engaged in. Essentially, Mr. Mullaney said, this was a progress report, and the extent to which it can be developed in the future depends on the executives of the companies in the industry.

Gas and the Colleges

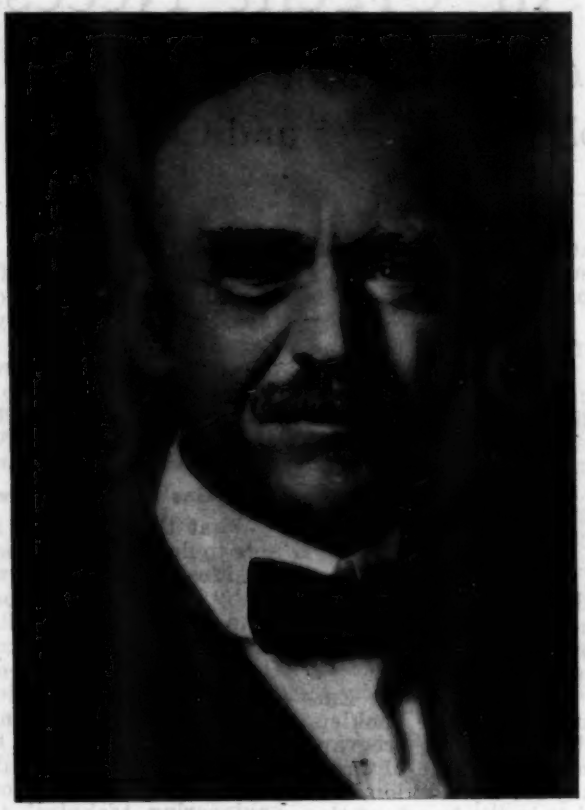
What the A. G. A. had been able to do in the colleges and universities of the country was taken up by W. Griffin Gribbel, of the John J. Griffin Co., Philadelphia, as chairman of that committee. He told of the committee's having gone before the educational institutions with the idea in mind of interesting college men to go into the gas industry, of delivering special lectures at various of the engineering, technical, trade and other schools, and of conducting a special class which because it had started so late—the committee began its work late in the last college year—had attracted only two men into the industry who had not intended to enter it.

The gas industry, however, he pointed out, had made real friends with the heads and instructors of every college and school it went into, and with another year of follow-up on the work begun in early 1924, he looked for a much larger number of college trained men to turn

their footsteps into the gas field. In conclusion, Mr. Gribbel read a number of most complimentary letters he had received from the university people inviting him and his co-operators to give them another opportunity to hear what was to be said for the gas industry. One institution, in fact, had made a series of lectures on gas, one of its required courses.

How to Fail

F. D. Van Amburgh, editor and manager of the "The Silent Partner," published in New York City, speaking for the Manufacturers' Section, and introduced by its chairman, threw the assemblage into gales of laughter in his story, "How to Fail." He made the points—"Others greet you as you greet them"—"Without honesty to self one fails with life"—"Loyalty to self"—and "kindness is an essential part of service."



H. M. Brundage, Treasurer American Gas Association

Other committee reports were delivered by W. T. Rasch, of the A. H. Wolff Gas Radiator Co., New York City, for the Committee on Standardization of Gas Appliance Specifications; by Harry C. Abell, of New York City, newly elected A. G. A. President for the Testing Laboratory Committee, and H. M. Brundage, A. G. A. Treasurer, for the Rate Fundamentals Committee.

The necessity for education both of the industry and the public it serves was stressed again and again by Mr. Munroe in his talk on house heating. "The habits of many lifetimes must be overcome," he said, "before the change to the use of gas for house heating can be brought about. We have to make the householders realize that to live in a home with uniform temperature, regardless of outside temperature, is not a luxury, but a health essential. This transition, like that from the old log fireplace to the stove and then to the coal fired furnace will require time.

Public Must Be Educated

"The public has always had its eyes turned largely to paring the monetary outlay in fuel without calculating very largely the benefits. One of our tasks is to educate them in the basic facts about house heating, to show them that by heating with gas-burning equipment they get not only a sure, convenient even heat, which can be regulated easily, but they also eliminate smoke, dirt, ashes and variations in temperature which often bring colds, pneumonia and other cold weather ailments. This education, in my judgment, will require several years. But with the public becoming always more comfort-loving and more attentive to health the demand for that which gives health and convenience is certain. The cost will become secondary—the luxury of today is the necessity of tomorrow. I believe we should undertake the house heating education of the public and I predict that in a future not so far distant house heating by gas will be the rule and not the exception."

Mr. Munroe told the association that although data on gas burning house heating installations is scant, from all the data available he is convinced that such business is profitable for gas companies as well as advantageous for their customers. He then went into the technical characteristics of the house heating gas load, which he said averaged about ten and one-half times the ordinary residence load.

Mr. Munroe's talk was the contribution of the Commercial Section to the general sessions.

Directors Gas Conference Meet

The Directors of the Eastern Coast Gas Conference held an executive meeting at the Chalfonte yesterday noon. Plans for the annual meeting of the Conference to be held early in 1925 were discussed. The meeting followed a luncheon.

Three Questions Answered

R. H. Burdick Gives Broad Views On Industry

We interviewed Mr. R. H. Burdick on the run (that man's always going somewhere) and obtained from him some more optimistic views in the gas industry.

"What are your ideas regarding the future of the gas business?" we asked.

"The investing public is undoubtedly one of the best barometers of modern business today and the demand for utility securities, especially those of concerns operating gas properties, was never stronger than at present. No other class of securities has withstand recent periods of depression so well nor achieved as strong a reputation for stability and permanency. This status indicates in the strongest possible manner the complete development of public confidence in the public utility as it is now conducted."

Skidding around the next corner we sprang our next query, viz.: "Do you feel that commission regulation is hurting the gas industry?"

"Some regulatory bodies have in the past issued orders and established rates and standards which have undoubtedly worked hardships on certain gas companies, but the personnel of most state and municipal commissions have improved, the sane business man replacing the petty politician in many cases. This change has been beneficial to gas companies and gas users alike in that regulatory bodies of the kind I speak of are recognizing in their recent orders the need for providing incentives for the exercise of good management. Usually, the incentive takes the form of providing for an increased rate of return on utility company investments paralleling rate reductions made possible by diligent attention to operating details and policies founded on sound economics."

Our next question called for a statement of Mr. Burdick's opinions on new developments in the art of gas manufacture and distribution.

"In water gas production the greatest single improvement has been the "back-run," invented by Messrs. Young and Whitwell, of the West Coast. Another forward step is the installation of large capacity oil storage tanks inside of gas holder water tanks. In two plants at the present time we have such tanks under construction which, when completed, will hold sufficient oil to serve their attendant water gas plants for more than a year. The position of plants, so equipped, with respect to the oil market, is obvious.

R. H. Burdick, Gas Engineer Electric Bond and Share Co., New York

In coal gas manufacture we are following closely the development of a small plant bench with more than double the capacity of equivalent standard construction benches.

Concerning oil gas production, one of our companies has evolved through their engineers a method of operating standard oil gas sets so as to produce recoverable benzol in large quanities without sacrificing any efficiency or capacity or using any additional raw materials or labor. This benzol is blended with gasoline and sold as motor fuel through companies owning filling stations.

In distribution affairs, we are laying centrifugal cast iron pipe with bronze welded joints for high pressure work and find this arrangement most satisfactory."

While still within shouting distance we asked Mr. Burdick's advice to young men entering business lift—should they embrace the gas industry as their life work. Being nearly out of hearing range we are not sure of his answer, but it sounded something like "Yes, we have no bananas."

Making the Best of Low Gas Pressure in the Exhibits

There seems to be some complaint about low gas pressure. We saw one exhibit that offers a cure for this, if not wholly, at least in part. The booth contained a number of appliances, actual flame in which was not really needed. To make the appliance look realistic, bits of colored paper were put over the burner holes and a draft of air kept these fluttering much as the actual gas flame would appear. The illusion was perfect. Mightn't it be worked out by others, who really don't need to keep the flame going in their machines, to substitute this method of demonstration so that those exhibits really needing a fair gas pressure might benefit?

Problems and Compensation

Two Excellent Papers Read to Industrial Gas Section

The second meeting of the Industrial Gas Section was as well attended as the first. Each report and paper was listened to with attention, and many questions were asked the speakers. The meeting was called to order by Chairman H. H. Clark, who wasted no time on preliminaries. W. D. Thompson, Hammond, Ind., was called on for a report on the "Forging and Heat Treating" booklet. Mr. Thompson said that the booklet was well on its way to completion and would cover the subject thoroughly. Several suggestions were made by those present as to information which should be included in the booklet. W. M. Hepburn, New York, made the report on the booklet, "Metal Heating." Oscar Bowen, Chicago, Ill., was not present and his report regarding "Tank Heating" was read by C. W. Berghorn, secretary of the section. W. M. Hepburn was again called on and reported on the booklet covering "Heat Control."

Industrial Gas and the Small Gas Company

The paper, "How to Solve the Industrial Gas Problem of the Small Gas Company," was presented by E. G. deCoriolis, Boston, Mass. This proved to be one of the most interesting papers of the meeting. Mr. deCoriolis said, in part:

J. P. Leinroth, Newark, N. J.

"I believe it is a generally accepted fact in the gas industry today that one of the greatest, if not the greatest, field for potential business in the further development of the industry lies in increasing the sale of gas for industrial purposes. Figures have been compiled showing that in the last decade the sale of gas for industrial purposes has increased sixteenfold, whereas, the total sale of gas for all uses has only increased threefold.

In discussing this subject I shall make no attempt to establish a line of demarcation between the small and the large gas company. In what concerns us the number, type and size of industries in the territory served by a gas company is of more importance than the total population within its scope. To serve, as illustration, a large textile center offers few opportunities for increased sale of industrial gas, whereas, a metal manufacturing center one-third its size would present an infinite variety of gas problems. The gas company serving the latter territory is the one with which we are mostly concerned. Its engineering staff usually consists solely of a plant engineer who has had no training or experience in pyrometallurgical or other industrial heat operations. What would appear to be the logical answer to this question is that the company should retain the services of a young technical graduaute as an industrial engineer. This would be a step in the right direction.

There should be co-operation between the small and large companies interested. The dairy farmers of Ohio pooled their resources and established in a few years one of the largest selling

E. G. de Coriolis, Boston, Mass.

agencies of dairy products in the world. The Sherman Anti-Trust law did not apply in their case, nor does it apply to that of gas companies which are engaged in a non-competitive business among themselves.

The initiative for such co-operation must rest with the gas companies. If they recognize the situation which confronts them and see the logic of co-operative effort, one way will have been found towards the solution of the problems.

Compensating the Industrial Man

J. P. Leinroth's paper on "The Basis of Compensation for Industrial Gas Engineers," threw much light upon the subject and showed much care and thought in preparation. A few of the salient points were: The efficiency of the man, the proper selection and training of the man; and the wonderful results obtained from proper application of scientific compensation methods.

If the industrial load is to be gotten, men of the proper type must be trained, and it necessarily follows that to obtain them and hold them, we must give them a compensation commensurate with the kind of men we require. Selling industrial gas calls for real sales ability; we are selling

a high-class product in competition with cheaper fuels and to sell it requires the application of first-class methods. The proper rewarding of men for service rendered, touching as it does so closely to human ambitions, hopes, and fears, is today recognized as the most difficult of our industrial problems, but it is fraught with tremendous possibilities.

Three plans were outlined:

First—Estimate the amount of gas sold and pay accordingly.

Second—Pay for increase consumption.

Third—Compensate on a load basis.

Each plan has its advantages and disadvantages; they are somewhat complicated, but it is difficult to draw up a simple plan which has no objections or disadvantages. All men in the industry should give the compensation problem serious consideration as the mental attitude of the Industrial Gas Engineer is all important and with this is deeply involved the plan of compensation we offer him.

Gas Industry Urged to Be Alert

H. O. Loebell Analyzes the Factors Controlling Industrial Gas Field

"After another year of work we come together again to talk over our objectives and ambitions, what we have done toward accomplishing them and what there remains for us to do. I think it is always inspiring at a time like this to review the forces working for or against us and make an attempt to determine where we should concentrate our efforts in the year to come.

"The potential market for industrial gas business is the sum total of all the heating operations carried on in this country in terms of the number of cubic feet of gas required to displace the present fuels used. This may sound like a fanciful dream until you analyze the economic factors back of it when you will see that it is based on facts and actual experience in industries where gas has displaced crude fuels.

"If you will recall the history of power development you will see that the gas industry is going through the same evolution and because of this we are in a position to take advantage of that experience. A few years ago only the dreamers believed that the time would come when the electric companies would be carrying the major portion of the power load of a community. Today we see communities where as much as 95 per cent of the total power load is carried by the central station electric company. Even the field of heating has been invaded which is in many cases justified because of the economics involved.

"Any gas man today knows that gaseous fuel performs heating operations with greater efficiency and higher overall economics per unit of energy than any other fuel known. Even the users of fuel appreciate this fact. The obstacle we encounter in effecting a greater use of gas as a heating medium does not lie here but in the cost of gas as compared with the raw fuels, oil, coal and coke.

New Systems of Rates

"Two things are necessary to remove this obstacle. One is the adoption by the gas companies of new systems of rates—rates which put the overhead burden where it belongs and bring the cost of gas down to a point where the manufacturer can use it with economy. The other is the perfection of equipment which allows for the efficient utilization of gas. When these two things are accomplished and only then will gas as a heating medium come into its own.

"Now, the question is how are these things going to be brought about. At the present time the spirit of the gas companies indicates a willingness to accept innovations in methods of gas-manufacture, in systems of rates, and in the new types of gas-burning equipment as long as there is no danger connected with them of jeopardizing their present position. This is being exemplified by the great number of requests which have come in from gas companies in different states for permission to supply gas of different heating values. This would make it possible for them to adopt processes of gas-manufacture which aim to gasify coal completely without producing coke or useing

C. C. Krausse, Industrial Fuel Engineer, Baltimore, Md.

oil for enriching purposes—the ultimate object of all gas-manufacturing companies at the present time.

"All this shows that the gas companies are now considering the possibilities of two kinds of business—that which is coming to them by right of their monopolistic position, and that which they should get by virtue of their ability to supply a service commensurate with the cost involved and which will meet the competition of other heating mediums on the market.

Meeting Competition

"How are the gas companies going to meet this competition? Look at the history of the electric power

development again. When the possibilities of the individual motor drive and the group motor drive first dawned on that industry, their first step was to acquire the services of a group of the most competent men they could find. The responsibility of these men was to find out exactly what the potentialities of electric energy were and to make a complete and detailed analysis of all the factors connected with the use of it. With this information in hand, they went straight ahead, sacrificing present losses for what they knew would be future gain. The expenditures they made were considerably in excess of what their business at that time justified, but since then it has been made possible for them to motorize practically all industries and reap a tremendous and just reward for their foresight and vision.

"In the same way, I believe that the first thing the gas industry should do is to arrive at a correct understanding of the factors underlying the cost of production in the various manufacturing concerns where heat is required. Competent men should make an analysis of the heat requirements of these industries and interpret them to the manufacturers from the economic standpoint. While for the present it might not mean additional business for the gas man, as in cases where the analysis could not be interpreted in favor of the use of gas as the heating medium—still it would provide a basis to work on and would undoubtedly mean business for the future.

"No man could consistently be given the responsibility of securbusiness in a community without having such an analysis at his command. It is insistent that he be in a position to classify his territory into two groups—that business which can be profitably taken on immediately and that which must be postponed until the cost of production with gas can be reconciled—and he cannot do this without a knowledge of the intangibles bearing on the situation.

Oil Being Eliminated As Industrial Fuel

"Sooner or later every manufacturer is going to have to ask himself—what is the fuel best fitted for industrial heating? Two powerful factors are bringing this condition about. One is the elimination of fuel oil as an industrial fuel, not only because the present improved refining processes are making it scarce, but also because even the quantity available will be to a large measure absorbed by the great number of house-heating installations which are being made today. The other is the precarious position of the natural gas companies. More and more of these companies are finding themselves in a position where it is necessary to withdraw the consumption of the industries in order to meet the requirements of the domestic customers.

"Now at the beginning of this critical period is the time for the gas men to be alert, and present their case to the industries before they find some other means than city gas to solve their problem. They must meet the manufacturer half way, consistent rate schedules must be established even at the cost of temporary losses. I would go so far as to say that gas can be manufactured under economical conditions for industries even if it is necessary for the gas company to maintain a separate system of distribution for them. Of course, this would only have to be taken into consideration when permission cannot be obtained from the public utility commission to make the quality of gas used for industries general.

"If all these factors are taken seriously by the gas industry, there is no question in my mind but that the output of the gas companies of the United States will be tremendously increased during the coming year, and that an era in which gas is recognized as the only fuel for industrial heating will truly begin."

Utilities Must Win Popularity

Commercial Men Plan Appeal to Builders

Although "Sales Management and Organization" was the title of what was to be a paper read before the Commercial Section of the A. G. A. in the Convention Hall at the Steel Pier yesterday afternoon by A. S. Goldsborough, there was no such paper. And the caption on the vigorous off-hand talk given to the gas folk by the secretary of the Baltimore Merchants' and Manufacturers' Association really should have been "How to Face the Menace of Municipal Ownership."

Mr. Goldsborough said it might just as well be recognized that, whether well or ill founded, there was a failure of the public to cooperate with the utilities companies. The main object of all public service companies was to win public popularity. They were in need of the public as a defender against radical legislation. In some quarters there was a disposition to adopt the Vanderbiltian attitude of the-public-be-damed and this sorely needed to be overcome.

Elements were at work stirring up antagonism in the communities. Some of this was engendered by the newspapers for various reasons. Mr. Goldsborough believed that the public was willing to be friendly if the public utilities made it believe they were willing to play the game fairly.

Nothing slams the door in the face of the gas salesman so tightly as the belief among householders that the companies are trying to take advantage. This prejudice had to be rooted out. Merchants were sore because the gas companies had a certain advantage over them in the sale of gas accessories and in collections for these. They did not like it. They had to submit because the public tolerated the custom. So soon as the public revolted the custom might be smashed. The speaker had heard

talk here and there of legislation to divorce gas companies from the sale of merchandise other than gas.

How very necessary was it not, he then suggested, that the commercial departments should sell appliances only of the best quality and on the closest profit margin. If the aggregate profits from the sale of sideline merchandise were shown to be excessive, then the public would clamor for a cut in the price of gas and the agitators would demand that the cities and towns themselves furnish gas to their inhabitants.

Mr. Goldsborough claimed a share for the salesman in the ideas which he brought in to the sales managers. This was the best way to build stability and excite the best efforts of the men in the ranks. This speaker held the close attention of the audience, he being the first on the list to deliver an extemporaneous exhortation. Along ethical lines his discourse ran chiefly, with a strong strain of the old but ever new doctrine that honesty and fair dealing is the best policy for utilities, and especially since they must show a strong front to those who would take them out of private ownership and operation. He was applauded heartily and on motion of B. H. Atwood of Wilmington received a rising vote of thanks.

G. I. Vincent, Manager Syracuse Lighting Co.

Architects and Builders Committee

Not so fervent but nevertheless of acute interest to the Commercial Section was the report of W. A. Adams, Chairman of the Architects' and Builders' Committee. It was formed in February, 1924, and beside Mr. Adams consists of D. A. Duvall, Robert Mahm, R. A. Koehler, Phillmer Eves, H. G. Walz and R. C. Lewis. The committee held its first meeting on March 24, 1924, to devise ways and means of increasing gas sales through co-operation with the architect, builder, master plumber, gas fitter and heating contractor.

"It was the opinion of the committee," said Mr. Adams, "that the best way to accomplish our ends

T. F. Kennedy, Manager New Business Department, H. L. Doherty & Co.

was by personal contact, that more intimate relations could be established by periodic calls on these classes of the trade to confer with them on all matters pertaining to the gas business, and to advise them in matters of interior piping, layouts, sizes, etc., to give data on extensions of mains and services, to suggest proper locations for meters, to properly interpret rules, which to the uninitiated may seem arbitrary, but which will, when clearly explained, show to be for the good of service. In short, to be of assistance to them wherever possible, and by this means keep our companies in the forefront of progressive utilities.

"The committee believes that the mailing of descriptive literature was a very ineffective way to conduct our campaign, for the reason that too often such literature found its way to the waste basket and even though read, it was done so hurriedly and no lasting impression was made.

"The committee recommended that the men to be selected for this work should be men who have a comprehensive knowledge of the gas business, at least insofar as would apply to the needs of those engaged in construction work. They should be men who feel that we are fulfilling a real need, that GAS is the biggest single factor in home comfort and convenience, and in the Industrial and Commercial world, the most vital agent of progress.

"The committee unanimously agreed that, to strengthen the contact that would be made by personal service calls, a file should be made up. The committee believes that this folder should be delivered by a special representative to every architect in the territory supplied by the local utility company, and literature descriptive and informative of the latest development in gas appliances would be inserted from time to time by your representative.

"The matter of servicing these folders with literature, through the American Gas Association, was discussed, but it was thought that because of the wide diversity of lines

A. S. Goldsborough, Baltimore, Md.

that are handled by the different companies throughout the country, the servicing would be better handled by each company, who would have literature that would be descriptive of the appliances they handle, and which are built according to A. G. A. specifications.

"Numerous inquiries have been received as to the methods of conducting an Architect and Builders' Service Division, and we have furnished a number of member companies samples and charts such as are used in this work.

"You have heard it said time and again by men who are prominent in sales promotional work, and no doubt your own experience has taught you that the first step in selling is to arouse interest. Well, it has been the experience of this committee that there is no better time to get that interest aroused than when plans are being drawn for a building, and the story of the Modern Gas Appliance which meets with the specifications of the American Gas Association and which is built for long life and economy of operation, can be graphically told.

"Now, I urge you to give more attention to this important phase of merchandising. You will find that your selling problem is greatly simplified, because if foundation work is thoroughly followed up, and adequate piping and additional openings are secured, the cost of installing appliances is lowered.

"You will be rewarded in the measure of your efforts. You will find yourself being more cordially received, by the Architect, Builder, Heating Contractor, and Master Plumbers and Gas Fitters, and because you are rendering a valuable service, gratis, increased sales will be the reflection of the cordiality thus established."

Ed Cooney, of Lowell, Mass., and his prize bovine are here again

House Heating

G. I. Vincent of the Syracuse Lighting Company, who spoke last year on "House Heating," read another paper on that topic. He told in technical detail the results of an experiment made in heating a house with gas that had previously been warmed by coal.

"The heating," Mr. Vincent said, "was very satisfactory, very noticeably better than when heated with coal. In fact, the heating had never been satisfactory with coal. In severe weather it had been impossible to be comfortable. The same furnace which when burning coal failed to heat the dwelling, when modified to burn gas heated it perfectly."

Another paper that aroused attention was one on "Compensation and Its Incentive to Greater Sales Efforts," read by Thomas F. Kennedy, manager New Business Department, Henry L. Douherty & Co., of New York.

A strong brief for window dressing was delivered by L. E. Lindsay, manager of the display section of the People's Gas Stores, Inc., of Chicago. Mr. F. L. Mendez's paper on water heaters is printed in full on another page of this issue.

Gas Company Has Right to Advertise

At the Advertising and Publicity Section meeting in the Blue Room, at the Chalfonte, Mr. J. E. Bennett, Publicity Manager of the United Gas Improvement Co., Philadelphia, and Chairman of that Section, read a report on the activities of the Publicity Section and outlined the work being done for the gas companies throughout the country.

Mr. Leonard Ormerod, Vice-President Public Utilities Advertising Association also read a paper on "The Right of a Public Utility to Advertise." Mr. Ormerod stated that in his opinion the utilities not only had a right to advertise but should advertise. He quoted the decision made by the Public Service Commission of the State of Connecticut in the case of the Gas Company at Stamford, Conn., which was published in full in a recent issue of the *American Gas Journal* in which they stated that it was proper for the gas company to set forth their message to their customers through the daily press.

Frank L. Blanchard, New Chairman

He stated that in the case of the Bell Telephone Company of Philadelphia, that the total advertising expenditures of that company did not equal 2 cents per month on each telephone, showing that this expenditure has not the slightest effect on the rate structure. This would undoubtedly be true with the gas utility.

He stated that every gas utility should lay out a regular advertising campaign so that the advertising manager of that company would know just how much money he could spend each month and could make his plans accordingly. A hit and miss advertising campaign will not pay.

He also spoke about the advisability of having an advertising agency handle the advertising and strongly recommended that it was much better to handle the advertising from your own office so that you can get that personal contact with the editor and manager of the local papers. This opinion was ably seconded by Robert Livingston, Advertising Manager of the Consolidated Gas Company of New York, who told of several instances where this personal contact with the papers had kept out advertising copy that would have been to a more less degree detrimental to the gas company.

Arthur W. Hawks, Jr. Vice-Chairman

Mr. Frank Blanchard, Henry L. Doherty & Co., New York, was elected Chairman, and Mr. Arthur W. Hawkes, Jr., Baltimore Consolidated Gas & Elec. Co., Baltimore, Md., Vice-Chairman.

"Jake" Jones, of Burlington, N. J., Wins a Dollar for the Other Fellow

Yesterday morning at 4 o'clock, Supt. Jacob B. Jones, of the Gas Light Company, was awakened at his home with an incessant ringing of his telephone. Answering the call, Mr. Jones was asked if he would not at once come to a restaurant down town upon an important matter. He hurriedly dressed and was in a few minutes at the place of business. There he found that the proprietor of the restaurant had but recently returned from Havre de Grace, Maryland, where he had picked several winning ponies and had brought back quite a roll. Feeling good he was still in wagering mood and in the course of an argument with some fellows in the restaurant he laid a bet that he could have a gas man in his place in fifteen minutes. That was his faith in the service of the corporation. The bet was made, he put in his call and had the head of the whole works at the restaurant within the time specified. Incidentally, the proprietor had discreetly left the place before the arrival of Mr. Jones. It is quite certain that there will be a meeting of the superintendent and the restaurant man a little later, when there will be an exchange of opinions regarding the matter. Anyway, the restaurant man won his bet. He knew the gas company's policies.

"THE GAME"

By Syd

This isn't such a bad world,
It's filled with gold and fame,
And it costs a fellow nothing
To get into the game.
The cards, sometimes, are greasy
And the chips come very slow,
But the longer you keep playing
The more you're bound to know.

This isn't such a bad world
In which we mortals live,
When things are dull and we can't take,
Why we can always give.
Then, when the skies get clearer
When clouds are not so black,
Your luck may be the better
And with interest t'will come back.

This isn't such a bad world
For those with lots of grit.
Just learn to grin and bear it.
Till you get used to it.
Walter Johnson kept on trying
Though twice he took a fall,
And then he beat the Giants—say,
This isn't such a bad world, after all.

Relations With Customers

Many Phases Discussed by Accounting Section

The one topic of discussion at the Wednesday meeting of the Accounting Section was the report of the Relations with Customers. The report was divided into four parts and was presented to the meeting by the chairman of the committee, DeWitt Clinton, of the Worcester Gas Light Co., Worcester, Mass.

The first part of this report was concerned with the Customer and Employment Partnership in Public Utilities as it Relates to Security Holders Records, which

W. H. Barton, Portland Gas & Coke Co., Portland, Ore.

was read by E. MacMorris, of the United Gas Improvement Company, of Philadelphia, Pa. This paper was concerned with a phase of that important movement in the utility, and particularly the gas field, customer ownership. The purpose of the investigation made by the committee, of which this paper was a report, was "to outline in this report a model form of records and the accounting procedure to be used as well as set forth an organization plan of procedure to be followed and the best methods to be used by a company in carrying on a successful compaign for the sale of its securities to its customers and employees."

The committee was accorded splendid co-operation by a number of gas companies that had run customer ownership campaigns and a study of the returns brought out the two following facts:

"1. The plan of campaign, covering such features as instruction to employees, advertising and general publicity, follows closely along the same general methods which have proven effective in so many cases.

2. Accounting and Record forms differ for practically every company, necessarily having been adopted to most closely fit in with the accounting procedure and general organization routine of the particular company, as well as the actual physical layout of the company."

The report included a number of standard accounting forms, which were recommended to the gas companies, who are planning to inaugurate a customer ownership campaign. A digest of a plan for the sale of stock to employees was also outlined in the report.

Errors and Their Correction and Prevention

The next section of the report was concerned with the paper prepared by the sub-Committee on Errors, presented by the chairman, J. M. Roberts, of the People's Gas Light and Coke Co., Chicago, Ill. The report was concerned with a study of the character of the errors made by gas employees and with methods that might be adopted to help in preventing such errors from being made. One important consideration in this respect is the classification of the errors into two great classes, according to whether or not they affect or do not affect the customer and the handling of the errors according to this division. A plan was outlined for dealing with errors and their prevention and the advantages of this plan, which is based primarily on the allocation of the errors to the department which is responsible and the institution of weekly drills on errors, are also given. The report was concluded with the presentation of a set of forms that may be used in this work.

Improving Public Relations

The third section of the report was concerned with the important topic of increasing the goodwill among the public through the calling of employees at the homes of the customers. This part of the report on Relations with Customers was presented by the chairman of sub-committee, W. H.

W. Baurhyte, Pres. Los Angeles Gas and Electric Corpn.

Barton, of the Portland Gas and Coke Co., Portland, Oregon. The paper took up the problem of selling employees on the service idea, the methods of accomplishing this end. It went into detail on the way in which the employee should behave when visiting the premises of the customer. It also discussed the procedure for reporting criticism and dissatisfaction. Various forms to be used in this work were also presented. It was emphasized that considerable care should be taken in the selection of these men, and more particularly in their education

and training so that the maximum beneficial results might be obtained through their contact with the customer.

Welfare of Employees

The last section of the report was presented by O. F. Potter, of the Public Service Gas Co., Newark, N. J., chairman of the sub-Committee on Welfare of Employees as Affecting Relations of Company with Customer. The report of the sub-committee covered the following subjects, bonus and profit-sharing plans, group insurance and promotion plans, sick benefit and death benefit plans, and pension and medical attendance plans. Each part of this report was discussed in considerable detail and various forms were included for recording the information on these matters.

This, the second meeting of the Accounting Section, was well attended and was a clear indication of the interest that is being shown in accounting matters and those that are related to accounting, although not actually concerned with mere figures. The papers presented at this meeting were fine examples of the really diversified interests of the accounting section, and indicated how this section, through the control that it exercises in the way of developing forms and plans, recording the results of studies and investigations reaches all the important matters that are confronting the gas industry at the present day.

Gas Men Hold Symposium

High Pressure Distribution, Coke and Research the Subjects of Interest at the Second Meeting of Technical Section.

The second meeting of the Technical Section, which took place yesterday afternoon, was replete with interest. Not only were the important subjects of high pressure distribution and coke thoroughly discussed, but a symposium was also held on the subject, "How Can Research Best be Organized to Serve the Gas Industry."

The need of research work in the gas industry is perhaps greater at the present time than at any other period of its history. Gas men are endeavoring to introduce gas as an industrial fuel in many new fields, which gives rise to a series of problems requiring careful and rapid solution. The use of lower grade combustibles as fuel in the manufacture of gas, particularly water gas, also introduces factors which necessitate the institution of research work to effect their proper regulation. The matter of high pressure distribution to supply manufacturing plants with gaseous fuel in also becoming of increasing importance and involves considerable experimental work before the correct solution of the problem can be obtained. In addition to the special problems that are now confronting the technical man, who is being pushed to the utmost to secure solutions for them, so that gas may go on progressing as it has done in the past few years, there are the regular problems of every-day occurence which require his attention.

All this comprises a rather heavy load under which the technical man is working these days. He must blaze the trail, in fact, prepare in advance for the steps that will be taken in the future, and if he is not put in the position where he can do this sort of work, experimenting, laying down the fundamental principles on which further development can take place, busying himself with research problems which may not be of such great importance at the moment, but on which the future development of the industry rests, in fine, if he cannot do research work in the way in which he sees fit, then the future progress of the industry will be retarded. For his function is always to be ready to apply in a practical way the experimental developments evolved in the laboratory and on a sem-plant scale.

Thus, the question of research is of peculiar importance to the technical man. The symposium held yesterday afternoon of this subject brought out the fact that the technical man was well aware of its significance, not only to him, but to the entire industry as well.

S. E. Fairchild, Jr., Pres. Cruse-Kemper Co., Ambler, Pa.

Many took part in the discussions, which were developed from the standpoint of research in co-operation with the Technical Universities and Government Bureaus, research as conducted by the individual gas company, and finally the advantages of an Association Research Laboratory.

High Pressure Gas Distribution

The paper on High Pressure Transmission and Distribution of Gas was prepared by R. S. Fuller, Engineer of Distribution of the Pacific Gas and Electric Co., San Francisco, Calif. This important subject was given a very careful treatment in this paper,

which dealt with most of the phases which must be considered when any study of high pressure methods is made. First, the performance of high pressure was compared with low pressure and the advantages of the former were described. The significance of high pressure from the standpoint of the industrial customer was also gone into. The costs of high and low pressure distribution were also discussed. Three different cases were described. The conversion from low pressure to high pressure was discussed as well as the various effects of the high pressure system on complaints, on meter performance, on unaccounted-for gas.

Coke

The Coke Committee also made a report at the meeting through its chairman, R. L. Fletcher, of the Providence Gas Co., Providence, R. I. This report was made up of several parts and both the technical and economic sides of the coke problem were discussed.

The first paper was concerned with the Selection, Preparation and Carbonization of Coal and Preparation of Coke. It was prepared by A. W. Grant, Jr., of the Minnesota By-Product Coke Co., St. Paul, Minn. Various points of technical interest were discussed in this paper.

The second paper was concerned with a description of the technical progress made in the study of coke and its value to the industry. This paper was prepared by Harold G. Ross, of the Koppers Co., Pittsburgh, Pa.

The third paper was on the subject of improving the quality of coke that is produced in horizontal retorts. It was prepared by John H. Doerres, of the LaClede Gas Light Co., St. Louis, Mo.; John L. Eigenbrot, of the Lowell Gas Light Co., Lowell, Mass., and R. L. Fletcher, of the Providence Gas Co., Providence, R. I. Considerable data was collected in this investigation and included in this investigation and included in this paper together with photographs of the coke produced under different operating conditions.

Another paper was devoted to the merchandising of coke in the small plant. This paper was prepared by J. K. Swanson, Consumers' Power Co., Saginaw, Mich. The methods of selling coke to the customer of a small plant company were gone into and the conditions affecting this sale were discussed.

The advertising side of the coke business was covered in a paper which was prepared by W. G. Rich, manager of the Coke Sales Department of the Providence Gas Company. The writer of this paper pointed out the great importance of advertising in the merchandising of coke. He urged the technical men to appreciate the value of advertising in this field and claimed that the gas company that advertised its coke persistently was the one that disposed of its coke and not only that but obtained a good price for it.

The delivery of coke was discussed in a paper by V. A. Miller, of the Rochester Gas and Electric Corporation, Rochester, N. Y., and the correct use of coke in the home by Samuel S. Wyer.

Gas Men Honored

McCarter and Beal Medals Awarded At Public Relations Symposium

Before an audience of three thousand officials of gas companies gathered in meeting at Haddon Hall last night, Patrick Augustine Gubgins of Whitestone, Long Island, N. Y., was awarded the American Gas Association's Meritorious Service Medal for conspicuous judgment, bravery and heroism in rescuing a man from drowning on January 12, 1923.

The medal is given in recognition of the most meritorious act performed within the gas industry during each calendar year and is donated by W. R. Addicks, vice-president of the Consolidated Gas Company of New York. Mr. Gubbins is an inspector and surveyor in the employ of the New York Company and is the recipient of the first award of the medal.

In the citation accompanying the award, Mr. Gubbins is mentioned as having performed a heroic and spontaneous act in the saving of human life when on January 12, 1923, he plunged into icy water fifteen feet deep and rescued a laborer from drowning. The rescue took place at the Astoria, Long Island, plant of the company.

Mr. Gubbins is the father of seven children and lives at 12 Eleventh Street, Whitestone, Long Island.

A. W. Warner, research engineer of the Philadelphia Sururban Gas and Electric Company, Chester, Pa., was awarded the Beal Medal.

The medal is awarded annually by T. R. Beal, president of the Central Hudson Gas and Electric Company, Poughkeepsie, N. Y., for the best technical paper presented at a convention of the American Gas Association.

The paper which won the medal for Mr. Warner was presented at the 1923 Convention of the Association, held at Atlantic City, and was entitled, "The Study of Some Physical Laws Governing the Carbonization of Coal."

There was no award of the medal in 1922.

Of five awards of the McCarter Medal to employes of gas companies in the United States who have resuscitated a victim of gas asphyxiation by use of the Schaeffer Prone Pressure Method during 1923, three went to New Jersey men, two of them employes of the Public Service Electric and Gas Company.

The two Public Service men who received medals were John Swain, Leonard and Westfield Avenues, Camden; and Elwood F. Coffman, 204 Tenth Ave., Haddon Heights. Both men are employed by the Cam-

den Coke Company and in their resuscitation work were assisted by the following who were awarded certificates:

L. E. Guice, 228 43rd St., Camden; E. Nicturn, 712 Grant St., Camden; James Lloyd, 515 Newton Ave., Camden; Grover Chambers, 775 Spruce St., Camden; Chris Watz, 288 Leeds Place, Woodbury; William E. Watson, 1110 South 2nd St., Camden; Howard Condon, 255 Ceader Cross Ave., Audubon; George Schultz, 745 Walnue St., Camden; J. Magiwinnix, 1008 Newton Ave., Camden, and David Godshalk, Jackson St., Camden.

The other New Jersey men to receive the medal was Morris Joslin, Highland Ave., Atlantic Highlands, employed by the County Gas Company. He was assisted by William Gordon of Atlantic Highlands who received a certificate.

In all three medal awards it was shown that the recipients and their assistants had saved the life of a fellow worker by prompt and efficient use of the most modern resuscitation equipment and the prone pressure method.

L. C. Meyer, chief clerk of the Public Service Company of Northern Illinois at Crystal Lake, Illinois, was awarded the McCarter Medal by the accident prevention committee of the American Gas Association.

The medal is the gift of Thomas N. McCarter, president of the Public Service Electric and Gas Company of New Jersey, and is awarded annually to any employee of a gas or electric company who rescues a victim of gas asphyxiation by means of the Schaeffer Prone Pressure Method.

In a citation accompanying the award it was shown that Mr. Meyer had saved the life of William Wallace, an employee of the Illinois Bell Telephone Company, when the latter, in installing a telephone conduit, had broken a gas service pipe and had been overcome with gas. The accident occurred on July 7, 1924.

Due to the prompt and efficient work of Mr. Meyer who not only used the prone pressure method in resusciating Mr. Wallace but who gave assistance after medical help.

Making the Pastries of All Nations

A Bake Oven That Turns Out Sweets Tasting Like More

We seem to have a young League of Nations in session at the convention this year. There's a nice big oven on display and a chef in charge who is turning out pastry of every nationality. Danish pastry, French pastry, German pastry, the Epicurean flour (or flower, just as you please) of every nation that cooks. With

R. L. Canniff, Central Hudson Gas & Elec. Co., Poughkeepsie, N. Y.

the exception, of course, of American pastry. There's no telling just when that most famous of American institutions, the American pie will make its appearance in the midst of this galaxy of delicious tid-bits.

But, to tell the truth, we hardly missed the pie. There was so much else delicious to eat that one simply didn't think of it till one left, appetite amply appeased, or whetted, depending on how much one took.

Then, the thought struck one, that the oven that made this League of Pastry, was itself an American oven.

And the whole point of this story is that the oven is a splendid American gas oven. Of course, we've had good pastry before, lots of it, but different kinds in different places, but never some of all kinds and nationalities in the one place. This is a very Geneva of pastry. Lucky we're not on a diet. We saw some people stop, look and listen to the pleased exclamations of those who were sampling the delicious morsels and then pass on with a woebegone sigh.

N. C. Rasmussen, himself a Dane, and an excellent pastry chef, introduced us to the oven, the invention of which he finally and with becoming modesty himself admitted. Having been a baker for many years, Mr. Rasmussen knew that ovens of the past had left much to be desired, in the way of oven heating, conservation of heat, the economy of stone baffles, the havoc that drafts had wrought with good baking, and other significant features.

So he went to work and brought this new type of oven into being. The whole oven is only 40 inches wide and 29 inches deep, as economical for space as any we know of, for the baking surface. By the use of tile baffles instead of metal ones, he eliminated an almost constant sore spot in the case of ovens which are wanted for continual use. Tile baffles do not burn out, we were told. By a siphon arrangement in the conduction of the heated gases, their flow is always even, and no chimney draft can affect the constant even distribution of heat. The various decks of the oven are independent of one another and the opening of one does not affect the heat of another to any appreciable extent. The entire arrangement is designed to conserve the gas heat, use it to the utmost and at the same time make the heat adjustable entirely at the chef's will.

Then came the story of how these ovens were making their appearance in hotels, hospitals, great restaurants, even prisons, throughout the country. And to wind up the story for this wonderful oven, "Have another cake, there are plenty of them here," said the kind lady in charge of their distribution. And while we couldn't possibly eat any more, the person to whom we gave this one and a companion for it vouched for its deliciousness.

Executive Board, American Gas Association. Left to right, sitting: William M. Crane, George W. Parker, Henry L. Doherty, Alexander Forward, J. M. Bennett, J. S. DeHart, Jr., R. B. Brown, J. B. Klumpp, H. M. Brundage, George B. Cortelyou, Charles A. Munroe, H. C. Abell, P. H. Gadsden and C. J. Ramsburg. Standing: C. D. Jackson, K. R. Boyes, J. E. Davies, L. J. Willien, C. E. Paige, W. A. Sauer, L. R. Dutton and Ord Preston.

Registration up to 5 p. m., Oct. 15th

A

Albrecht, G. H.; Baltimore, Md.; St. Charles
Alden, J. D.; New York City
Ammerman, Ray; Jenkintown, Pa.; Traymore
Ackroyd, John H.; Bridgeport, Conn.; Holmhurst
Adams, Larmour; Erie, Pa.; Traymore
Allen, W. S.; Baltimore, Md.; Traymore
Allison, W. A.; Phila, Pa.; Plaza
Anklam R. G.; Crisfield, Md.; Breakers
Armstrong, John J.; Toronto, Can.; Seaside

B

Bahr, C. C.; New York City; Strand
Baldwin, C. K.; New York City; Ambassador
Bean, P. H.; Jersey City, N. J.; Strand
Bellamy, C. R.; New York City; Shelburne
Bettle, W. H.; Newark, N. J.; Brighton
Boney, S. E.; Raleigh, N. C.; Fredonia
Brockhoff, H. C.; Chester, Pa.; Shelburne
Brown, H. W.; Phila., Pa.;
Brown, M. A.; Kokoma, Ind.; Traymore
Bruse, H.; Baltimore, Md.; Traymore
Bryne, D. E.; Brooklyn, N. Y.; Craig Hall
Barnes, C.; Boston, Mass.; Traymore
Barnhard, P.; Mt. Carmel, Pa.; Ambassador
Battin, H. W.; Camden, N. J.; Strand
Behram, Henry; Brooklyn, N. Y.; St. Charles
Black, John; Poughkeepsie, N. Y.; Shelburne
Black, Wm. H. Jr.; Plainfield, N. J.; Ambassador
Bratton, S. C.; Birmingham, Ala.; Strand
Buck, Geo. V. Jr.; Phila, Pa.; Traymore
Burns, C. H.; Bay Shore, N. Y.; Chalfonte

C

Claytor, G.; Phila., Pa.; Marlborough-Blenhiem
Colquhoun, E. M.; Middletown, Pa.; Breakers
Connors, T. A.; Yonkers, N. Y.; Sterling
Creeden, D. F.; New York City; Strand
Cameron, Wm. R.; Phila, Pa.; Ambassador
Cauffman, S. H.; Phila, Pa.; Haddon Hall
Christie, A. G.; Baltimore, Md.
Chubb, C. N.; Davenport, Iowa; Traymore
Coffman, E. F.; Camden, N. J.; Strand
Coleman, Philip L.; Newark, N. J.; Strand
Coles, J. M.; Elizabeth, N. J.; Haddon Hall
Colyer. A. D.; Elizabeth, N. J.; Haddon Hall
Craig, Ira L.; Phila, Pa.
Craymer, Frank W.; Phila., Pa.;
Creely, Geo. L.; Somerville, N. J.; Strand
Cortelyou, Geo. B.; New York City; Brighton
Cummings, W. W.; Boston, Mass.; Ambassador

D

Darlington, F. H.; Glassboro, N. J.; St. Charles
Davis, E. S. Jr.; Phila., Pa.; Shelburne
Diblin, G. A.
Dill, J. H.; Baltimore, Md.; Strand
Downs, F. D.; Derby, Conn.; Bothwell
Durr, E. C.; Newark, N. J.; Haddon Hall
Davis, E. F.; New York City; Craig Hall
Davis, W. I.; Jenkintown, Pa.
Deegan, Wm. A.; New York City; Chalfonte
Detjen Harry M.; New York City; Brighton
Duggan, F. P.; Lewistown, Pa.; Seaside

E

Ebert, P.; New York City; Breakers
Eichengreen, L. B.; Phila., Pa.; Traymore

F

France, F.; Newark, N. J.; Knickerbocker
Fieser, F. J.; New York City; Strand
Flor, A. W.; New York City.
Foland, A. W.; Phila., Pa.; Ambassador
Fulling, John L.; Phila., Pa.; Traymore
Fulweiler, W. R.; Phila., Pa.; Ambassador

G

Geffine, L. W.; Boston, Mass.
Glaessner, A. F.; Meriden, Conn.
Greene, B. H.; Sebring, O; Ambassador
Gunn, J. M.; London, Ont. Can.; Strand
Gilbert, M. F.; Phila., Pa.; Seaside
Grimes, L. E.; Boring, Md.; Brighton
Goodman, Patrick; Brooklyn, N. Y.; Breakers
Grubb, E.; Saranac Lake, N. Y.; Ambassador

H

Heckman, J. C.; Noblestown, Pa.; Shelburne
Heiss, L. C.; Phila., Pa.; Knickerbocker
Heller, Max; Phila., Pa.
Hendrickson, E. E.; Newark, N. J.; Drighton
Hendrickson, G. S.; New York City; Ambassador
Hill, H. E.; Newark, N. J.; Haddon Hall
Howe, C. T.; Brooklyn, N. Y.; St. Charles
Hoyt, W. G.; New York City; Chalfonte

Hutchinson, F. R.; Cleveland, O.; Ritz-Carlton
Hergesheimer, Geo. M.; Phila., Pa.; Strand
Hill, F. H.; Elmira, N. Y.; Ritz-Carlton
Hitzel, A. B.; Spartanburg, S. C.
Hoener, H. C.; St. Louis, Mo.; Strand
Hoff, John F.; Princeton, N. J.; Knickerbocker
Hones, Chas. J.; Baldwin, L. I., N. Y.; Breakers
Housel, J. L.; South Amboy, N. J.; Haddon Hall
Humphrey, H. E.; New York City; Traymore
Huff, W.; Baltimore, Md.

J

Jaques, C. F.; Aurora, Ill.; Strand
Jones, D. T.; Pottstown, Pa.; Morton
Johnson, R.; Richardson Park, Del.; St. Charles
Johnston, E. D.; Connersville, Ind.; St. Charles
Jones, T. N. Jr.; Norfolk, Va.; Ambassador

K

Keillor, H. D.; Belmar, N. J.; Breakers
Kenwisher, C. W.; Baltimore, Md.; Strand
Kebbe, A. L.; New London, Conn.; Ritz-Carlton
Kersting, A. F.; Raleigh, N. C.; Breakers
Klein, A. C.; Boston, Mass.; Ambassador

L

Larson, E.; Islips, N. Y.; Breakers
Lawson, W. H.; Rutland, Vt.; Traymore
Leichner, C. W. H. Jr.; Camden, N. J.; Strand
Lewis, Geo. E.; Denver, Colo.; Traymore
Lavelle, Wm. J.; Boston, Mass.; Ambassador
Lesley, R. W.; Phila., Pa.; Shelburne
Leuchtenberg, Wm. E.; New York City; Seaside

M

McCann, T.; New York City; Strand
McCarthy, J. B.; Yonkers, N. Y.; Sterling
Macomber, A.; Charlestown, Mass.; Ambassador
Michaels, L. B.; Pittsburgh, Pa.; Breakers
Mink, C.; Newark, N. J.; Strand
Montgomery, H. L.; Bartlesville, Okla.; Traymore
Morley, J.; Englewood, N. J.; St. Charles
McConnell, H. N.; New York City; Chalfonte
McConnell, R. W.; Phila., Pa.; Strand
McDonald, T. W.; York, Pa.; Traymore
MacEuney, P. F.; New York City; Traymore
MacDaniel, W. J.; New York City; Strand
Martell, W. H.; Austin, Minn.; Knickerbocker
Martin, C. E.; Passiac, N. J.; Ambassador
Maurer, R. H.; New York City; Strand
Mawha, J. K.; Camden, N. J.; Strand
Milener, E. D.; Baltimore, Md.; Traymore
Morgan, C. S.; Rochester, N. H.; Princess
Morgan, Prof. J. J.; New York City; Strand
Murphy, F. D.; Houston, Texas; Ambassador

O

O'Brien, E. J.; Toledo, O.; Traymore

P

Patrick, R. L.; Burlington, Vt.; Traymore
Pennell, G. C.; New York City
Peterson, W. G.; Yonkers, N. Y.; Traymore
Phillips, C. S.; Phila., Pa.
Porter, H. C.; Phila., Pa.; Llewellyn
Pratt, E. W.; Brooklyn, N. Y.; Pennhurs
Pruyn, J. W.; Yonkers, N. Y.; Traymoret
Parkhurst, Geo. W.; New York City; Strand
Parish, Wm. H.; Phila., Pa.; Haddon Hall
Parr, S. W.; Urbana, Ill.; Ambassador
Payne, C.; New York City; Ambassador
Pearson, T. L.; Jenkintown, Pa.; Claredon
Penn, W. W.; Baltimore, Md.; Strand
Pratt, V. E.; New York City; Ritz-Carlton
Price, H. B. Jr.; Phila., Pa.; Ambassador
Prichard, Chas. R.; Lowell, Mass.; Ambassador

Q

Quackenbush, C. H.; Wilmington, Del.; St. Charles

R

Reid, J. F.; New York City; Bothwell
Reilly Wm. E.; Newark, N. J.; Strand
Roberson, J. C.; New Brunswick, N. J.; Shelburne
Ryan, B.; New York City; Pennhurst
Rodgers, W. J.; Haddon Heights, N. J.; Ambassador
Rose, J.; New York City.
Ross, C. W.; Phila., Pa.;

S

Secord, W. L.; New Rochelle, N. Y.; Ambassador
Scott, J. J.; Lewiston, Me.; St. Charles
Scribner, W. H.; Bridgeport, Conn.;
Sherwood, H.; Yonkers, N. Y.; Bothwell
Simmonds, S. E.; Phila., Pa.; Traymore
Smith, C. F.; New York City; Breakers
Smythe, C. W.; Trenton, N. J.; Strand
Speller, F. N.; Pittsburgh, Pa.; Chalfonte
Stull, C. R.; Phila., Pa.; Ritz-Carlton
Schauer, F. F.; Pittsburgh, Pa.; Traymore
Schmist, C.; New Durham, N. J.
Scott, J. M.; Wilmington, N. J.; Strand
Smith, D. R.; Baltimore, Md.; Haddon Hall
Smith, Thoas W.; New York City; Brighton
Spring, W. T.; Cape May, N.
Sprong, S. D.; Me Sprong, S. D.; Middletown, N. Y.
Stacey, J. E.; Cincinnati, O.; Haddon Hall
Stark, F. M.; Poughkeepsie N. Y.; Seaside
Stewart, H. S.; Bridgeton, N. J.; Normandie
Strain, G. H.; Ithaca, N. Y.; Traymore
Stevens, Geo. F.; New York City; Strand.

T

Taggart, Chas. W.; Norwich, Conn.; Ritz-Carlton

U

Underhill, Henry L.; Baltimore, Md.; Traymore

V

Von Maur, J. D.; Toronto Ont. Can.; Chalfonte

W

Walsh, J. H.; Brooklyn, N. Y.; St. Charles
Warner, G. H.; New York City; Chalfonte
Weaver, H. C. ; New York City; Brighton
White, B.; Lynchburg, Va.; Shelburne
Work, R. D.; Phila., Pa.; Strand
Weaver, E. A.; New York City; Traymore
Wells, F. H.; New York City; Shelburne
Wharton, Henry; Phila., Pa.; Ambassador
Will, Philip; Rochester, N. Y.; Monticello
Woolen, Chas. E.; Baltimore. Md.; Breakers

X

Xylander, Peter; Hackensack, N. J.; Haddon Hall

American Gas Journal

SIXTY-SIXTH YEAR

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ISMAR GINSBERG, Technical Editor

Editorial Offices: Atlantic City, Chalfonte Hotel; Booth Telephone, Steel Pier Marine 5744

*The Possibility of Developing the Water Heating Business

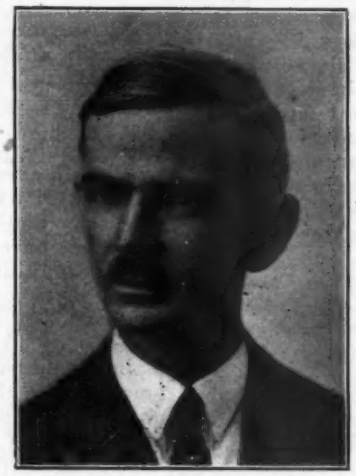
A valuable dissertation on how to increase gas consumption for water heating

F. L. Mendez

Philadelphia Suburban Gas and Electric Company, Chester, Pa.

THE very title of this paper, "The Possibility of Developing the Water Heating Business," presupposes that people use and need heated water. Therefore, with an established and discernible use for our product, heat, the problem then presents itself," what would be the most efficient and economic plan of operating so that the people on our territory heat water by a gas-fired appliance built for that purpose and discard the use of coal, oil, etc." That is one of the reasons why we are here.

As we reasoned it out, two main avenues forked themselves before us, each to a common goal, viz.: increased popularity of the gas water heater; as most of us contribute toward the support of an automobile, we will talk automobile language, believing that it will be thus made clear on the subject at point.



F. L. Mendez

The Y in the Road

Here we are at a "Y" in the road; on each arm of the "Y" a detour sign is present pointing to the other arm; a two-fold problem. On the left hand it is a question whether we should sail right into our friend, the "bucket-a-day" phantom, and knock it with all the vigor and vitriol our budget makes possible; and we may represent the detour to the right as emphasizing the instantaneity of the Automatic and further taking the stand that the gas company is a sort of Grand Monitor "St. Georging" it between the customer and the nefarious water heater manufacturer and distributor. Obviously, both of these roads spell increased water heater load. It is clear that wherever any old kind of a water heater, never mind its make, displaces coal, it is going to increase that household's consumption, at least temporarily; but where a home becomes equipped with a contrivance, usually in the cellar, that not only demands anticipation of one's needs, but insists upon mental and physical effort after the expiration of such need, frequently, "cold water will do," and we lose just that much consumption. The circulating water heater is the one in mind.

True, we can sit in perplexity before this fork and looking down each lane of thought pictured you see little country lanes joining these two main arteries of travel, a sort of Pilgrim's Progress, as it were. In all instances these minor road problems connect the two main thoroughfares. Over here on the left we see "Compromise Alley"—buy a gas heater off us and enjoy its many benefits in the summer, use your range boiler or furnace tape-worm in the winter; certainly inconsistent and to some extent weak-spined, because most of the "becauses" of a gas water heater are true both in summer and in winter. Still over here on the left we discern "Baron Munchausen Lane," a narrow but well traveled highway; "all the hot water we need for a ton of pea coal a year"—**43 pounds a week** (the bold face is the author's). If we choose the left, what are we going to do with the coal enthusiast, pass him up?

Then, look what we have on the right pike that emphasizes automatic hot water service and puts a halo over our heads. First we strike the tracks of the chap that uses the circulating heater, but lots of times "cold water will do, darn it," and we lose. Further up we come to the question of the tank heater with distant control, which come mechanical, electrical, pseudo-automatic.

The Plumber and the Gas Company

So you see it is granted that each detour has its auxiliary problems to be solved, when once the decision is made to go after this water heating business. It is made interesting when you have four or five wholesale plumbing houses on your terrain, all pushing coal and gas water heaters indiscriminately; and situated immediately adjacent to a city of a couple of million people containing a score of water heater manufacturer representatives who are busy tramping over what we kid ourselves in calling "our

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*Presented at the meeting of the Commercial Section, A. G. A., Atlantic City Convention, Wednesday, October 15, 1924.

bailiwick." To this must be added the "Israelite and the Samaritan" attitude of plumber and gas company (and we are no exception). That is our situation and it certainly can be called interesting. But you were left in the car looking over detour signs and fields at large. What will you do about it? You will do the same thing we did and that is, drive right over the "keep off the grass" sign and tackle all of these things as you come to them, a middle course, so to speak, which you will find after a short while has been often traveled before.

Stunt Advertising

Stunt advertising, brass band tactics with full page announcements of 60 point type captions are very like O. K. enough, but down our way the papers are blest with a rate averaging 10 cents per thousand circulation per inch and we had to go into second gear for budget reasons. On the other hand, I have seen typical "campaign" methods (steam caliope and everything) used with fully satisfactory results, both as to number installed and as to absence of any loss of dignity usually associated with the public utility business. No general decrying of ultra-intensive drives is inferred by this paper; they have been used too successfully and too often for any such inference, and we concede "that the proof of the pudding, etc." The recitation of our plan and our experience might well profit some hearer, however, who objects to the campaign and thinks there can be no other pathway to reach this water heating business.

The Pleasure of the Gas Water Heater

Another departure from the orthodox might be the fact that while our advertisements and literature may talk up the cleanliness, flexibility and convenience of the gas water heater to the men, we preached the luxurious pleasure of it. The automobile, the movies, Atlantic City, if you please, cater to our pleasure instinct and to some extent to our luxury instinct. Certain people must be sold on the "pride of ownership" idea with a dash of "keeping up with the Jones'" sauce. They will give you the kindly ear on the purchase of a luxury but must be absolutely sold a necessity. This thought of the luxury of the thing can be used more effectively than you suspect. It can well be here emphasized that our publicity copy took it for granted that the reader admitted his need for hot water, so that little, if any, effort was made to sell hot water. This left us valuable space to talk up the medium of securing hot water, promptly, cleanly and in a modern fashion.

The Two-Part Rate and Its Effect

One of the big, if not the biggest, factor that enabled us to boost our water heater sales 400 per cent over the previous year was an alternate rate made effective around the first of this year; alternate because the consumer may elect to go on it or stay on our also present block rate. This new rate is a two-part affair with a fixed commodity charge of 90 cents per M. cubic feet of gas and a graded monthly demand charge. Analysis of this rate is, of course, outside the scope of this paper, it being mentioned only because of its contribution towards increasing water heater popularity. Its effect on the ratio of types of water heaters sold (instantaneous as against storage) is apparent thus: From July, 1922, to July, 1923, of the Automatics sold, 66 per cent were of the instantaneous type; whereas from January (date of this rate) to July, 1924, only 5 per cent were of the instantaneous type. Might inject here that of the 1,257 water heaters sold from July, 1923, to July, 1924, 800 were sold during the period April 1 to July 1.

How Rate Was Used

As concrete examples how this new rate, which primarily might have been intended to solve an industrial gas situation, was used, we give the following: Fitter, meter reader or salesman reports a household as using anthracite for water heating. The consumption is looked up and being only a range one it will average less than 3,500 cu. ft. per month the point at which the two rates parallel each other in costs. Equipped with this information and convinced we have a prospect for a water heater on our hands, the "cost of upkeep" appeal is brought to play in one of two ways. Suppose the candidate admits 500 pounds of coal a month (charitable enough) as the cost of his water heating, this new rate is explained to him promptly and just as promptly he points out in the words of the poet, "it don't mean nothing" at his present monthly consumption; but as the benefits of this new rate are not all monopolized by industrial gas and it can very well be used as a leverage to boost domestic load, we aid his arithmetic thus:

Present range consumption, 3,500 cu. ft. monthly at $1.70	$5.95
Approximate cost of anthracite coal for water heater at $12 ton	3.00
Total fuel for two purposes	$8.95

Use of Gas for the Purpose

Estimating his water heater monthly consumption in gas as the same as his range, we now have a 7,000 cu. ft. user and entitled to all the rights and privileges of this new rate. The slogan, "Get the Figures," was used throughout our advs. and literature, so we submit the figures:

Present range consumption (though it is apt to decrease)	3,500 cu. ft.
An estimate of the water heater consumption	3,500 cu. ft.
7,000 cu. ft. at 90c per	$6.30
Monthly demand charge	2.60
Total fuel cost for the two purposes	$8.90

There is no catch or juggling of these figures whatever unless the gentleman cares to admit that his coal fire is out most of the time, so that 500 pounds per month is high, he has an uncomfortable time keeping off the dotted line. Cleanliness, no attention and all that usually swing the scales in favor of the appliance salesman.

Or if our man is prone to argue the matter he would be bluntly asked why not use gas for water heating; "Not at $1.70" with a possible and meaningful addition, "Philadelphia only pays a dollar." Would he use gas for water heating if it could be gotten for $1? Sure he would, for the difference between $1 and $1.70 is so vast that he feels perfectly secure in that confession and might even charitably add that he would give us $1.15 per M. The salesman, after repeating his admission that he would use gas for water heating if it came at $1 per M. often enough so that there could not be any possible misunderstanding submits gas at $1 for water heating thus:

Present range costs 3,500 cu. ft. at $1.70	$5.95
Estimated W. H. gas 3,500 cu. ft. at $1	3.50
	$9.45

This, of course, could not be billed this way for Commission reasons and, as we have seen before, would amount to but $8.90—55c leeway. It is admitted that this may not be any too nicy-nice a method, for you have deliberately placed your customer in a jam—framed him, so to speak; but it is nevertheless cold figures, and we should remember special cases call for special doses and the end may justify the means provided one is not open to the charge of sharp practices. These figures, in fact, the whole argument, is "loaded," and must be extremely carefully handled, for any misfire is apt to result in friction through the "salesman said" nuisance. It would be just as regrettable for eleven gas company salesmen to go through a water heater sale of goodly numbers without a snarl or two for me to straighten out as it would be for me to come here and tell all about it and have everybody say "that's fine"; on the one hand, you'd soon have eleven plump cherubs hustling for a living and I certainly would be entitled to wings. No, you simply can't please everybody.

It goes without saying that a great deal of this sort of work had to be done in the evening, particularly where an Automatic was involved, the expenditure of the sum being passed from housewife to husband. Also, the figures used, though true enough, in a number of instances would have to be increased, say, for a forty-gallon example, in relation to the number in the family. But to some extent they keep their same relativity, as the amount of coal being used is correspondingly greater.

The Prime Essentials for Success of a Hot Water Heating Campaign

Now back to the preface admission that no novelty attaches itself herewith. It is to be hoped, however, that ours be added to the long list of cases that prove you can increase your water heater sales through organized effort and practically through the regular oft preached theme of small down payment, etc., with judicious advertising, if you will not forget to keep everlastingly after the men in the field, without nagging, as they hold the last trump and success. Canvassing must be insisted upon, no hit or miss method. To beg the question and assume this is agreed, the importance of picking your men you are going to employ is manifest. Tidiness, alertness, no clock watcher or floater and all that sure, but be convinced that he grasps the difference between selling for an ordinary mercantile house and selling for the gas company. I need not dwell on the reason for this; it is obvious but important. But what's the use? What makes a good water heater salesman? If his trousers are constantly bagging, he simply has to sell more water heaters; if he continually disobeys instructions, he has to sell more water heaters; if he keeps you busy straightening out alleged misstatements, more water heaters; if he is a liar, well, I never found one yet that could sell enough water heaters to overcome that. In short, it is a matter of debit and credit, up to certain intolerable qualities when you take the bit in your mouth and settle the matter by bouncing.

On this question that the gas company should stand between its customers and the doubtful appliance manufacturer and distributor, let it be said that this is no altruistic pose. The only possible way we have of making real our cry of Service is through the operation of some gas appliance. We may call on sequential logic and say that the better the appliance the better the service; the better the service the more public appreciation it gets; the more one appreciates a thing the less attention is paid to the cost. After all, are not our customers more interested in the quality of the service rendered than the cost of that service? The question of public good will with its eradication of friction also materially enters into the matter. Besides, where franchise requirements demand gratuitous adjustment and general attention to appliances on your lines, this Monitor idea immediately ceases to be altruistic and becomes cold business acumen.

Competition

Our competitors—for the appliance department of the utility, unlike the monopolistic end of the business, is in constant bidding competition with the hardware store, department store and mail order house, not to mention the manufacturer's sales repre-

sentatives—are with few exceptions selling good merchandise. Here and there you may strike a particularly rotten contrivance, however, and if on no other stand the appliance department can justify its efforts and existence by simply stating that every water heater we install removes for quite a long time any chance of one of these misfits getting in to became a source of expense to us, annoyance to its user and eventually give the gas water heater a black eye.

Sales to Builders

All of the foregoing relates to retail sales. Sales to builders, plumbers, etc., were not overlooked; but in dealing with operative builders it was soon discovered that the department could not stand up successfully before the price appeal onslaught of the other fellow—coal and gas. Building material and labor costs added to the infamiliarity of a great number of home-seekers with our new rate, rather compelled the builder to cut corners, and it was only occasionally that they could be induced to pay the price we were compelled to ask for our water heaters. We had to go around to the back door, as it were, and if the character of the operation warranted an automatic storage in place of the coal-fired affair decided upon, we chummed close enough to the builder to secure the name and address of the home purchaser as soon as hand money was passed. To some extent this was also done when a circulating heater was involved. He is approached independently and frequently could be convinced that coal is passe; or the new rate quite naturally helped us materially. Sales of this sort, involving as it does the disposal of a coal heater, usually go through the builder as a matter of policy, if not placation.

Salesmen of other automatic water heaters were not slow in using this alternate rate as a selling point. As intimated before, there are water heaters not sold by us that are eminently respectable and built to give complete satisfaction; I am sorry to add, however, in our opinion, others have sacrificed size, quality and performance for price, and with these we feel we do have a quarrel. Where they cross our salesman's path he has instructions to state that they are not recommended, and let it go at that, so that there will be no complications or compunctions. This is as it should be, for they cause us no end of annoyance and trouble. We have to live with these people, service the appliance and stand the "poor gas" jab. Fortunately, they are few in number and are mainly confined to the small credit houses whose purchasing agent thinks a water heater is a water heater and has neither inclination nor ability to go into those things that brand them as a pirate appliance and off standard. We adhere strictly to one make of circulating heater and two of the automatic storage type, and though it is always exasperating to lose a sale on account of the price resistance, we are more or less content.

The Rental Plan

As a departure in attempting to increase domestic water heating load we had our rental plan. The attached copied from a circular on this plan is self-explanatory. Superficially the idea looked like a winner; in operation the results were mediocre. In endeavoring to get at the root of the trouble, we are inclined to believe that a goodly portion of the sales resistance is from the salesman rather than the customer. It is evident that the sales commission on a rental contract would be but a fraction of that on an out-and-out sale; and there you are. While we opine that this condition is contributory to us only putting out about sixteen automatics on this plan since May—when we first offered it—the suggestion is in part negatived by the fact we put the salesman on salary, with not much better results.

There would seem to be a well ground-in idea in the public's mind that the automatic belongs in the banker's home only; afraid of the consequential gas bill. Having enough confidence in the automatic to anchor its consumption at a certain figure, varying, of course, with the size of the machine, it simply meant the cost of this gas at the new rate plus maintenance and installation charges, divided by the number of months involved to give the customer a fairly accurate figure as his monthly hot water service bill. Ten dollars monthly might sound high as a water heating cost for the modest home, but you know the automobile has taught us all a whole lot about depreciation, and our man usually figures that as the rental contract, in practice, is cancellable any time, he has not much in the appliance and consequently has not much to lose should he decide to break his contract. Against this he realizes the apparatus is being bought and good for years of service after the expiration of the rental period. Up to date we have had no cancellations. Efforts have been by no means exhausted to popularize this rental plan; in fact, it is purposed to shortly present the thing to our customers in an entirely different angle and expect results. This is a side play—as you will devise side plays—to boost the gas water heater; the more the better.

In closing, let us add that, in addition to the small down payment, long credit, etc., we had our set quota, special bonuses, daily meetings, monthly conferences, stiff compression on the field men at all times and all the fixin's that we thought would assist, but the main thing is canvassing—cold missionary work, and don't be told any different.

While the total water heaters sold July, 1923, to July, 1924, viz.: 1,095 tank, 23 instantaneous, 139 automatic storage, might seem puny to many present, the percentage of increase (400) might help matters; particularly at a time when employment was and is below par and our local prosperity so dependent on steel, ship-building and textiles, none of which may be called booming.

*Coke

Studies are included from the technical and economic side of coke Report of 1924 Committee

R. L. Fletcher

Providence Gas Company, Providence, R. I.

THE aim of the Coke Committee for the past year has been (1) to create and develop interest among the gas industry in coke; (2) to indicate the pertinent points of coke manufacture, preparation and merchandising; (3) to act as a clearing house for any and all inquiries pertaining to coke; (4) to pave the way to increased activities for future coke committees.

Coke Bulletins

The committee has attempted to cover the first two points by issuing periodically a series of coke bulletins, copies of which are included as a part of this report. These bulletins were sent only to the company representatives of the American Gas Association. That this method of rousing interest in coke is productive of results was evidenced by the surprisingly large number of inquiries and questions sent to the Coke Committee by various members of the association.

Advertising

Feeling that an interchange of ideas on coke advertising would be of interest and value, the committee communicated with every coke producing gas company in the country, asking for copies of all recent advertising copy used by that company. A relatively small return, considering the size of the coke industry, was made to the committee. A large percentage of the smaller companies do not advertise at all or only in the fall of the year. The committee selected what it considered the best copies and reprinted them for distribution with the coke bulletins.

R. L. Fletcher

Clearing House

As noted in the foregoing, the committee received many inquiries relative to coke merchandising, preparation, etc. The present Coke Committee feels that this feature of its work was well worth while and hopes that future coke committees will develop and expand the clearing house idea.

Present Status

In spite of the fact that there are many companies who are cognizant of the value of a progressive coke policy, the general tendency throughout the industry is to let well enough alone. When the gas managers appreciate that the gas consuming public supports the coke consuming public, there will be a cry for a greater residual return on coke than at the present time, which, generally speaking, is possible only when the same care and attention that is given to the production and distribution of gas is given to coke.

Future of Coke Industry

The Coke Committee feels that the future of the coke industry is dependent, to a large degree, upon the attitude taken by the gas engineers of today. That the sendout of gas will materially increase year by year is quite evident. It is also evident that a reasonably large percentage of new gas producing equipment will be for coal gas. This in itself is indicative of the need of a complete understanding by the members of the gas fraternity on all matters pertaining to the production of coke and the development of the coke market.

Future Activities on Coke

The subject "coke" for a committee's consideration and activity is somewhat comparable to the subject gas. They both cover a vast field of technical

*Presented at the meeting of the Technical Section, A. G. A., Atlantic City Convention, Wednesday, October 14, 1924.

and practical problems of manufacture, preparation, distribution and merchandising.

It would seem that if the industry and the association desire to take the subject of coke seriously, they should take steps to materially increase the size and scope of the committee on coke. It would be practical and feasible to divide a general coke committee into at least three sub-committees for the consideration of the three major divisions of the subject, namely: 1. Manufacture; 2. Usage; 3. Merchandising.

Work of Present Committee

As mentioned in the foregoing, the principal aim of the present committee has been to stimulate interest throughout the industry in coke and not to attempt to cover the vast and intricate problems of the various phases of the subject. However, in order that tangible material and views might be presented to the association as the work of this committee, various members of the committee have voluntarily prepared the following articles, which are incorporated as part of this report:

1. Selection, Preparation and Carbonization of Coal and Preparation of Coke. A. W. Grant, Jr.
2. Technical Progress in the Study of Coke and Its Value to the Industry. Harold J. Rose.
3. The Subject of Improving the Quality of Coke Produced in Horizontal Retorts. John H. Doerres, John L. Eigenbrot.
4. Merchandising Coke in the Small Plant. J. K. Swanson.
5. Advertising. W. G. Rich.
6. Dispatching the Company's Coke Trucks. V. A. Miller.
7. Correct Use of Coke in the Home. Codified by Samuel S. Wyer.

An article on the correct use of coke in the home is in the pamphlet issued by the Smithsonian Institution, entitled "Correct Use of Anthracite, Bituminous Coal, Coke, Manufactured Gas, Natural Gas and Oil in the Home," codified by Samuel S. Wyer, Associate in Mineral Technology, Smithsonian Institution. This pamphlet is not included with the report, but may be obtained by writing to the Smithsonian Institution. This pamphlet will be found of considerable interest and value to the gas industry in studying the problem of coke.

Selection, Preparation and Carbonization of Coal and Preparation of Coke

A. W. Grant, Jr.

St. Paul, Minn.

IT IS obvious, doubtless, that the aim should be to select that coal, or mixture, that will render the greatest revenue to the plant, irrespective of the relative yields of products, as long as the yield of no one product falls short of fulfilling the obligation of the plant in that particular.

Too much consideration is frequently given to obtaining high by-product yields, or to operating the plant as a technical success alone, rather than to the commercial or economic end, producing the cheapest possible products compatible with a fair return on the investment.

Now if we assume the ability of the plant to dispose of all its products, the next two related considerations of major import are: the selection of a coal or coals that will give a gas meeting the requirements of all consumers; also the choosing of that coal mixture that will produce a coke satisfying trade specifications for percentages of ash and sulphur and for ash fusion temperature and percentage of total sulphur.

The selection of a coal, or mixture, for a carbonizing plant is analogous to the proportioning of materials making up a concrete mixture. The former is a mixture of volatile matter, cementing material, carbon and ash; the latter, of volatile matter (water), cement, sand and gravel, respectively.

Ash and Sulphur Contents and Agglutinating Values as Reflected by the Transition of Size of Coal

In making a selection it is very important to consider the size of coal purchased. The smaller the size the greater is the danger of spontaneous combustion, or at least deterioration, when in open air storage. On the other hand, it will be found that no two dissimilar sizes of any given coal will show like analyses.

Within practical limits, some coals will show increasing contents of ash and sulphur with an increase in size of that coal; conversely, others will be found to have opposite trends of sulphur and ash contents for changes in size of the coal. Hence the screenings from some coking coals are superior to lump sizes, while for others the lump sizes are preferable to the screenings.

Sulphur

Apropos of sulphur, a coal is usually acceptable if the total sulphur reported does not exceed a certain, arbitrary plant maximum; such a specification, however, may fall short of meeting not only the best interests of the coke consumer, but also those of the coke and gas manufacturer.

Of the total sulphur in the original coal, more will be liberated as volatile products and less will be retained by the coke as the temperature is changed; also, as the weight of the charge—for a given coal and pulverization—is increased. The latter reduces the cracking space above the charge and increases the velocity of effluent volatiles.

Pulverization

It would appear as though fine pulverization was conducive of better mixing of coals and assisted in the formation of larger, less fractured coke, besides offering greater coal surface per unit weight.

It should be recalled, however, that the weight of a unit volume of coal increases up to a certain point with increased pulverization and then the weight decreases, hence a maximum oven charge requires a definite fineness of coal. This fineness varies with different coals and ash contents, and may, within practical limits, change the charge by as much as 4 per cent, or much more, one way or the other. Fineness of coal is, therefore, of considerable practical value in increasing plant capacity, while at the same time it gives a tendency towards a more compact charge, which is conducive of increasing the yield of sized coke and is one reason for improved coke structure with greater use of low volatile coal.

Cementing Material in Coal

Conversely, the importance of pulverization is indicated by recognizing the fact that the amount of "necessary cementing material" required reduces in accordance with decreasing size of the coal. Primary degradation is very largely due to "sponge," which is indicative of a surplus of cementing material, or due to insufficient over-coking. Under-coked coke is in a highly expanded condition and thus suffers excessive abrasion along the brickwork while being discharged from a carbonizing chamber, while over-coked coke suffers primary degradation largely by virtue of shrinkage and splitting up of coke bundles due to contraction at elevated temperatures.

Another condition to be satisfied is that the percentage of ash in a carbonizing mixture can, within a certain range, be varied at the expense of carbon, though there is a most favorable ratio between that portion of cementing material in the coking mixture and that of carbon and ash, so if the ash portion is fixed by trade requirements, it is desirable to select a coal, or mixture, that allows of the proper balance between cementing material (moisture-free volatile organic matter content, approximately) and fixed carbon—for a given ash content. This balance can, in a practical way, be ascertained by comparing the results of trial coals, or mixtures, with a standard.

Also, the amount of cementing material in coal can, within certain limits, be thrown either to coke or tar, just as ash can be varied at the expense of carbon, within limited range.

The Coal Blend

The coal blend should be such that there is neither an excess of high volatile nor of low volatile coal in the mixture. The tendency of the former condition is to produce a friable coke due to a surplus of cementing material; of the latter, to produce the same result due to a deficiency. In either case, the yield of braize is increased (though it is different in character) with a corresponding reduction of sized coke. This reduction naturally affects—first, the gross revenue, and then the cost of gas per thousand, and often to a degree far beyond any possible saving that could be obtained by more efficient recovery of the other products more popular with gas men in general.

Coke Degradation

A study of these points will indicate a trend that is too little considered in many gas, and some coke plants; still less understood by most coal companies: that of coke degradation. The yield of sized coke can be maintained at a maximum only when the coking mixture is "in balance"—factors of heating, quenching and handling remaining constant.

Of course, a surplus of cementing material tends toward more porous and friable coke; not alone more friable because of the greater porosity, but because the greater moisture content of coke possessing high porosity detracts from its strength.

Besides these, there is still another angle from which to consider coke degradation. It is somewhat speculative, but worthy of much reflection. If the question of coke size does not hold paramount position, and that of total plant degradation governs, it may be wise to forfeit coke size and a small amount of surplus gas in order to bring about increased degradation within the carbonizing chamber (that is, primary degradation) by means of higher final temperatures. For such conditions, an increase in the fuel gas consumption may be more than offset by the attendant advantages of a tougher coke and the subsequent reduction in "secondary" (during handling and screening) and stock pile degradations, especially so if the coke output has to undergo crushing.

Heating

As heat is applied to the coal mixture, it will undergo the formation of coke, and the qualities of this major product are proportional, in a large measure, to the amount of heat applied. There is, moreover, an optimum rate of supplying heat which, if ignored, will lead to inferior qualities in coke produced.

High temperature coke made in narrow carbonizing chambers is more combustible than lower temperature coke produced in wider chambers because of the rapid evolution of gas and quick "setting" of the residue, which makes the former more porous, while the rapid passage of gas does not allow, to the same extent, of the "breaking down" of tar and hydrocarbons, which add to the density of coke. Also, the latter coke receives increased depositions of "transmuted" or vitreous carbon because of the longer time of contact between the volatile hydrocarbons and coke. Decomposition of gases is facilitated by interposing solids in their passage of flow.

Advantages of High Temperature Carbonization

High temperature carbonization, therefore, permits the carbonizing of a greater range of low grade coals. This is possible both because of the more rapid speeding away of oxygenated compounds as well as the accelerated advance of temperature gradients. These conditions accentuate the rate of decomposition and "fixing" of cementing materials and thus allow a portion of such materials to assist in the formation of low temperature coke rather than to allow them to become degraded by remaining too long in contact with hot surfaces.

For obtaining the best results uniform heating is essential, not only between wall and center of the charge, nor from top to bottom, but as well to maintain commensurate heat supplies at narrower and wider portions of the charge. In the case of older types of ovens, which reverse the fuel gas from pusher side to coke side and vice versa, this can better be accomplished by properly proportioning the respective time intervals than by fuel gas rates, otherwise it becomes a singular problem.

Selection of Coal—"Ideal Mixture"

In summing up the several more important factors that should be considered in selecting a coal mixture, it is apparent that, largely from a technical point of view, chief consideration should be given to:

(a) Ash content.
(b) Sulphur content.
(c) Coking quality.
(d) Ability of plant equipment to properly proportion the percentages of the several coals constituting the mixture and thereafter properly mixing them, to the end that the mixture be maintained with unerring constancy.
(e) Coal mixture that readily lends itself to carbonization by means of the peculiar characteristics of the local carbonizing unit.
(f) Coal that will give desirable yield of coke per thousand feet of saleable gas.
(g) Finally, the selection of a coal mixture that permits of the production of coke, the characteristics of which are best suited to meet local requirements—not necessarily demands.

In making these statements, it is presupposed that one considers only coal mixtures that yield gas and by-products of desired quality and quantity. Such a prepared coal mixture as these specifications call for can best be had by the selection of a single coal of intermediate volatile matter, rather than a number of coals requiring individual selection and proportioning as steps in attaining the most gratifying results. In short, I think that the "one coal mixture" is the desideratum in the matter of selecting and preparing a coal charge.

This latter recommendation fails, however, to be of general practical value for the reason that there is not enough available coal of such description as to meet the demands of the coke and gas industries, outside of the freight rate question. Nevertheless, there does appear to be more available than is used in such plants as it can be economically used, and where it can be best employed. The many advantages attending the adoption of such a coal charge do not seem to be very generally recognized.

Coke Quenching

Coke quenching should be carried out so that a minimum of degradation results; also, so that the coke will thereafter not contain moisture above trade (consumers') demands. These results may be had by rapidly quenching with a small amount of water, and this necessitates a uniform coke distribution throughout the quenching car, as well as a proper design of spray pipes. The proper quenching of coke is also influenced by the imbibition of the coke. The quantity of moisture absorbed decreases with a greater use of low volatile coal in the mixture, with a decrease in the oxygen content of the original coal, and with over-coking.

Coke Handling

Coke should be screened and handled with as few operations as possible since each screening or handling reduces the yield of sized coke and increases that of braize. Conversely, there should be sufficient sizing-screenings and re-screenings to maintain a uniformly sized and clean coke production at all times. It is just as important, if not more so, that this practice be followed with the smaller, as with the larger sizes of coke.

In conclusion, I wish to state that this paper will have thoroughly satisfied my expectations if it accomplishes no more than to awaken a wider interest among members of the coke and gas fraternity in the principles underlying the selection and carbonization of coal.

(This section of the report has been abridged.—Editor.)

TECHNICAL PROGRESS IN THE STUDY OF COKE AND ITS VALUE TO THE INDUSTRY

Harold J. Rose, The Koppers Co., Pittsburgh, Pa.

(Due to lack of space, this part of the report has been omitted.—Editor.)

Improving the Quality of Coke Produced in Horizontal Retorts

A report of a series of interesting experiments

John H. Doerres
Laclede Gas Light Co.,
St. Louis, Mo.

John L. Eigenbrot
Lowell Gas Light Co.,
Lowell, Mass.

R. L. Fletcher
Providence Gas Co.,
Providence, R. I.

IT IS the opinion of the Coke Committee that insufficient attention has been paid to the quality of coke produced in retorts and it was decided to investigate this matter to some extent, not with the view of completely investigating the subject during the ensuing year, but with the hope that it may lead at least to further work which will ultimately result in raising the standard of quality of retort coke in general.

With this view in mind, it was decided to first see what benefits would accrue from using a mixture of coals in the horizontal retorts instead of using 100 per cent of any one kind of coal, which is the universal practice. It was found entirely feasible to make practical tests in order to obtain results that would be comparable, inasmuch as coke ovens were available in Providence and St. Louis and horizontal retorts available in Lowell and St. Louis. Consequently, certain mixtures of coals were charged in ovens in Providence and in retorts in Lowell as well as in ovens in St. Louis and retorts in St. Louis.

(Tabular data and photographs have been omitted. —Editor.)

Coke Density

For domestic use and most industrial uses requiring domestic sizes of coke, there exists a strong preference for a small-celled, heavy coke. This preference has been independently arrived at in many localities and is probably a sound requirement. Consequently, the investigation of the results of the carbonization tests carried out is made interesting by the opportunity of clearly noting the effect of pulverization and mixture of coals on the density by means of cross-sectional photographs.

Effect of Coal Pulverization

In by-product coke oven practice, it is not possible to make a general rule for the effect of coal pulverization on coke porosity. It may be said, however, that in the case of coals which naturally tend to give a somewhat dense coke, pulverization usually results in a still denser coke. This effect is often quite striking. In the case of coals which normally give a fairly open coke, pulverization may not make much difference in the porosity as actually determined, although the size of cells is usually smaller and the structure more uniform. In by-product oven practice coal pulverization almost invariably leads to a very gratifying increase in coke size and strength.

Disadvantage of Pulverized Coal

An undesirable feature of the use of pulverized coal is the increased tendency of certain coals to form sponge at the top of the charge. This is of little practical importance in the case of by-product ovens because the actual weight of the sponge is negligible and the top few inches of the charge is but a few per cent of the total.

Effect of Mixing High and Low Volatile Coal

In general, the addition of low volatile coal to a high volatile coal does not usually increase the density of a coke. In fact, in coke oven practice, a moderate amount of low volatile coal is sometimes added to open up the cell structure. A small amount of low volatile coal oftentimes will increase the size of the cells and frequently will increase the porosity. However, no fixed rule can be made, although in general it may be stated that low volatile coal increases the size and strength of the coke produced.

While the addition of low volatile coal reduces the tendency towards sponge formation in by-product coke ovens, it confers new properties to the plastic coal mass, which possibly may lead to the continued formation of porous coke in horizontal retorts.

In the case of the oven coke, it was noted that the addition of the low volatile coal tended, in each case, to produce a firmer and blockier coke.

General

Without question, it may be stated that the full value of low volatile coal in a mixture cannot be obtained without pulverization when the coals are used in ovens. On the other hand, from the results obtained in the tests at Providence, Lowell and St. Louis, it does not seem that any definite conclusions can be arrived at without further investigations along this line. It is extremely difficult to make a fair and comprehensive comparison of two dissimilar cokes or coking processes in a brief report or in a report based upon a limited number of tests. Furthermore, perhaps it is not always fair to judge two coking processes by the results obtained by coking the same coal mixture, since each may require a definite type of coal to produce the best results. It should always be borne in mind that in comparing the various types of coke producing plants, it is necessary to consider many features, such as the percentage of salable coke produced from particular coals, the price which the coke will bring, the range of coals which can be successfully coked, the variations in coke which can be produced to meet changing market conditions, etc.

*Relations with Customers

Report of 1924 committee

DeWitt Clinton

Worcester Gas Light Company, Worcester, Mass.

Introduction

During the past two or three years it is safe to say that no other phase of public utility work has received more attention and consideration than that of bettering our relations with customers. The change in the attitude of our public utility toward its customers has been fully as great, if not greater, than any change in the manufacture or distribution of the product which we sell. As a result we can already observe an almost right-about-face in the attitude of our customers toward us. From an attitude of antagonism, or, at the best, placid indifference, it is fast becoming one of real interest and sympathetic consideration.

Many things have contributed toward our better public relations. It is not entirely that we have brought into our utility during the past few years men of greater ability and wider vision with higher ideals because there are cases of the old-time gas officials turning out to be the most progressive and most ardent supporters of all the highest type of up-to-date public relations.

However, it has taken men with high ideals and logical ideas, including Samuel Insull, Philip H. Gadsden, Henry L. Doherty, Charles M. Cohn, and the late Henry M. Byllesby to put their shoulder to the wheel in order to lift us to the heights to which all our gas utilities are ascending, to a greater or less degree, today; heights to which only a few years ago no one in our industry dared even to lift their eyes.

DeWitt Clinton

The managing committee of the Accounting Section under the chairmanship of Mr. J. Wesley Heins was fully alive to the benefits to be secured by better relations with our customers and late in 1922 appointed a general committee on Relations with Customers. The chairman of the Managing Committee for 1924, Mr. W. A. Sauer, decided to continue the committee for another year. Therefore, as this is the second year the committee has functioned, perhaps it would be well to review in this introduction the work of the committee in 1923, as well as to briefly touch upon the reports to be submitted to this convention.

We all heard Mr. Gadsden say at last year's convention that in the eyes of our gas customers the meter reader, the fitter or the trouble man, or the girl at the switchboard, or the man or woman in the cage who takes the money, represents the gas company. These are the people from whom our customers get their conception of our policies.

The Managing Committee of the Accounting Section selected four subjects for reports and discussion at the 1923 convention, as follows:

Development and Education of Personnal.

Credit and Collection Policies and Contractual Relations with Customers.

Co-ordination of Order Taking and Order Executing Departments.

High Bill Complaints.

Excellent reports were delivered on these four live subjects. A thorough review of each one of these carefully prepared reports would, no doubt, even now show us where we could improve our public relations in more ways than one. All the papers were of such a high order that it seems almost an economic loss to have them prepared and read at one convention and then never again referred to or consulted in any way. We here take the liberty of urging you all to brush up on the points which were brought out in these 1923 papers of the Accounting Section for the improvement of our public relations.

For the 1924 convention four new subjects have been selected and reports prepared for reading and discussion. These subjects are all up to the minute and very vital to the welfare of our gas utility and plainly point out to us many ways for improving our relations with customers.

The subjects are as follows:

Security Holders' Records and Customer and Employee Partnership in Public Utilities.

Welfare of Employees as Affecting Relations of Company with Customers.

Errors—Their Correction and Prevention.

Improving Public Relations Through Employees Calling at Customers' Premises.

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*Presented at the meeting of the Accounting Section, A. G. A., Atlantic City Convention, Wednesday, October 15, 1924.

Each chairman and each member of the sub-committees has worked assiduously to make his report a valuable contribution to the gas industry. We believe that they have succeeded and your general committee recommends that to each one you give a careful hearing and then enter into a wise discussion of the paper. We feel we should not in this introduction even point out to you the high spots in these reports, but should act merely as a herald or prologue and welcome you to participate in a pleasant, profitable, interesting and instructive afternoon.

Respectfully submitted,

DeWitt Clinton, Chairman, Worcester Gas Light Company, Worcester, Mass.
Armstrong, J. J., The Consumers Gas Company of Toronto, Canada.
Barton, W. H., Portland Gas & Coke Co., Portland, Oregon.
Bennett, O. G., Northern Westchester Lighting Co., Ossining, N. Y.
Bonsall, R. F., Consolidated Gas, Elec. Lt. & Power Co., Baltimore, Md.
Burrows, G. S., Consolidated Gas Company of New York, New York.
Coveny, E. P., Minneapolis Gas Light Co., Minneapolis, Minn.
Dexter, F. P., Fall River Gas Works Co., Fall River, Mass.
Doering, W. A., Boston Consolidated Gas Company, Boston, Mass.
Heins, J. W., United Gas Improvement Co., Philadelphia, Pa.
Hoffman, F. C., St. Paul Gas Light Co., St. Paul, Minn.
MacMorris, E., United Gas Improvement Co., Philadelphia, Pa.
Murfit, W. G., Bucks County Public Service Co., Newton, Pa.
Murphy, J. E., Pacific Gas & Electric Co., San Francisco, Cal.
Payne, T. P., Brooklyn Union Gas Co., Brooklyn, N. Y.
Perkins, C. D., Malden & Melrose Gas Light Co., Malden, Mass.
Potter, O. F., Public Service Gas Company of New Jersey, Newark, N. J.
Price, O., Citizens Gas Light Company, Quincy, Mass.
Roberts, J. M., Peoples Gas Light & Coke Co., Chicago, Ill.
Schaper, H. C., Milwaukee Gas Light Company, Milwaukee, Wis.
Scobell, E. C., Rochester Gas & Electric Corporation, Rochester, N. Y.
Scott, J. M., Wilmington Gas Co., Wilmington, Del.
Tossell, A. L., Peoples Gas Light & Coke Co., Chicago, Ill.

(Due to want of space, it has been impossible to reproduce the papers prepared on the four aforementioned subjects. These will be found in the original report published by the American Gas Association.—Editor.)

*High Pressure Gas Transmission and Distribution

Its general discussion and how it compares with low pressure distribution

R. S. Fuller

Engineer of Distribution, Pacific Gas & Electric Company, San Francisco, California

IN THIS paper there will be attempted a general discussion of the subject of high pressure gas transmission and distribution, touching on most of the phases which must be considered when any study of high pressure methods is made. It is well realized that the subject is such a large one that it will be impossible to go into any great detail in any of the sub-divisions of the problem. Were the outline used here to be followed in making a close study of the question it would fill a volume of no mean proportions, so it must not be expected that this effort can give more than a general aspect of the possibilities of high pressure; if it does even that, it will be of a value to justify its existence.

*Presented at the Sixth Annual Convention of the A. G. A., Atlantic City, Wednesday meeting of the Technical Section, October 15, 1924.

Performance of High Pressure Compared to Low Pressure

It seems almost a paradox that any discussion of high pressure gas transmission and distribution should become, in the last analysis, but a comparison of the handling of gas by high pressure methods with the handling of gas by low pressures. But this must necessarily be so for some time. At least it must

be so until some method of high pressure distribution has entirely or almost entirely replaced low pressure; for until then the low pressure method, the one first used—and now most extensively used, will be the yardstick by which all methods will be measured, both as to physical performance and economy.

Advantages of High Pressure

Probably the greatest advantage possessed by the high pressure method is its extreme flexibility, which permits the response to varying demands for gas within wide limits with no change in the physical properties which would influence the amount of capital invested. This flexibility makes it possible with the raising of the plant pressure over periods of peak demands, in systems where the limit of capacity is nearly reached, to increase the amount of gas flowing through the mains and permit the postponement for a few years of further additions to capital. While this entails added expense for gas compressing at the higher pressures, it is often conducive to economy in the long run by deferring capital investment in mains from times of high prices, or undue activities in other construction work, to times when the necessary additions to capital investment may be much more economically made.

High Pressure and the Industrial Customer

There is an increasing field for gas use in the industrial and commercial ends of the business among consumers who will obtain the best economy from gas, if it is available, at pressures considerably above the range of low pressure systems. Many of these consumers require pressures of from five to ten pounds per square inch. Where only low pressure gas is available such pressures can be obtained only after compressing the gas on the consumer's premises. The utility does not consider this compressing as its duty and were the consumer to install the necessary compressing equipment the expenditure, with the cost of operation of the compressor, must be charged against the cost of the gas and it is likely that the gas cost will be so increased as to make it less economical than other fuels, and the business is lost. In districts where high pressure gas is available such business as this may be obtained and held against the competition of other fuels.

Supplying Peak Hour Demands

With the growth on most gas distribution systems (at least during the peak hours), taking place as it is in the newer residence districts at locations farther and farther from the gas plants, it entails real study as to how best to supply the peak hour demands. While the peak hour demand is not growing in comparison with the demands at the other hours of the day (because the industrial business and off peak hour consumption by domestic consumers are helping fill in the valleys), still as compared to the peak hour demands of a few years ago, the one of the present is growing rapidly. Some companies have met this situation by the erection of district holders, to be filled during the night hours and other hours of small gas use and put on the lines to supply gas during the peak hours. If district holders are not used, it then, of course, becomes necessary to supply all of the gas directly from the plant. This means there must be adequate transmission mains, and if transmission mains are to be depended upon for best efficiency they will operate at more than a low pressure of a few inches of water column. It will probably be best to use some modifications of high pressure, if not straight high pressure, for this service.

R. S. Fuller

Use of District Holders

While many companies consider the scheme of using district holders a happy solution of the problem, it may be that such a system is going to be increasingly difficult to put into practice in the majority of, if not in all, localities. There is an ever-growing movement in favor of municipal beautification and, no matter how the gas man may look at it, planning commissions are not prone to look upon gas holders as things of beauty. Already some companies have met with public disfavor of district holders to the extent that a radical change in location has been necessary to satisfy the authorities, and as any change from the chosen location undoubtedly meant a sacrifice of some of the desired results, the purpose of the holders whose locations were changed have been, at least in part, defeated. This difficulty, having recently arisen, will probably continue, and just as all manner of associations similar to the American Gas Association are in existence in different lines for the interchange of ideas, so are the municipal bodies meeting in their associations and keeping themselves informed as to the activities in other cities. This means that the success of any of them in achieving their desires is but the incentive for others to "go and do likewise." For that reason no company should feel itself immune, as the attitude of their own municipal authorities will be largely influenced by action taken in other cities.

Comparative Costs of High Pressure and Low Pressure Gas Distribution

In order that the information developed may be of value to all, with but little further calculation

necessary, and that of the simplest kind, we will ascertain the costs of delivering gas by both high and low pressure on new systems designed particularly with highest efficiencies and economies in view. It will probably be found later, that though these systems are what might be termed "handpicked," the comparative costs will be applicable to any existing systems. These comparative costs will be determined by comparison between high and low pressure systems under three different conditions, viz.: Case I. will be a comparison between high and low distribution systems, one mile square, with the plant supplying them located at the edge of the systems. Case II. will show comparisons for transmission and distribution systems, and Case III. will cover transmission and distribution for large systems. These comparisons will show the effects on costs of consumer density of from thirty to two hundred per mile of main.

Case I.

For the first comparison it will be assumed that the two square miles of distribution for high and low pressure respectively are so located that the plant supplying them is at the edge of each of them, and therefore, no transmission main will be required; sales per consumer are forty thousand cubic feet per year.

The placing of the plant as described, at the edge of the distribution system, would entail some changes in the arrangement of the mains in the two systems to insure proper delivery, but as this would affect both systems alike it will not be considered as altering the costs in any way.

It will be assumed that at the beginning there will be thirty consumers per mile of main. This, of course, is a very low figure, but probably many companies enter new territory in a small way with fewer consumers than thirty per mile. At least, thirty per mile is a good base from which to start, and the use of this low figure will in no wise affect the accuracy of the figures in the higher densities.

(Tables and curves are given in the original article, which contain comparative high and low pressure costs.—Edit.)

The curves illustrate that with only thirty consumers per mile of main the high pressure system is by far the more economical of the two, and that it is not until a figure of about 145 consumers per mile is reached that the cost of low pressure distribution is less than that of high pressure.

While sales of 40,000 cu. ft. per consumer per year will be found representative of the sales of many companies in the United States today selling manufactured gas, it may well be suggested, that if we are to expect a peak hour demand of thirty cubic feet per consumer, this figure of 40,000 cubic feet will be low. For this reason, a comparison of costs was made, putting the annual sales per consumer at 50,000 cubic feet, all other factors remaining as before.

Case II.

It has always been the popular idea that the field for high pressure distribution is in the localities somewhat removed from the gas plant and the following comparisons are made to ascertain the effect on the comparative costs, of varying distances from the plant and varying densities of consumers per mile of main. In order to make these comparisons, the high pressure costs due to investment in compressors and the cost of compressing the gas should be taken out of the distribution costs and included in the transmission, as the costs due to compressing will vary with the length and size of the transmission line.

With sales of 40,000 cubic feet per consumer per year and with the edge of the distribution system one mile from the plant, a six-inch main will suffice for the high pressure system with an initial pressure of twenty pounds per square inch until the consumer density reaches 100 per mile of main; from there on the costs are calculated on a basis of thirty pounds initial pressure.

It is found that with 40,000 cubic feet sales, the costs when transmitting to the low pressure system with the ten-pound line are less than when using the three-pound line until the consumer density reaches 90 per mile of main and that the high pressure system is more economical than the low pressure system with either the ten-pound line or the three-pound line until consumer density reaches 160 per mile.

With sales at 50,000 cubic feet the low pressure system varies but little whether using the ten-pound or the three-pound line, and both show less costs than the high pressure system when there are a little more than 140 consumers per mile on the lines.

From other curves which are shown in the original article it is very apparent that as the distance of the distribution system from the plant increases there is more economy in the use of the ten-pound line as compared to the use of the three-pound line for the low pressure distribution system, and in the use of high pressure transmission and distribution as compared to either of them.

An increase of sales for a given system, as was pointed out before, operates to the benefit of the low pressure system where such a large proportion of the cost is due to the capital invested, which may remain constant for a considerable growth in sales and thereby reduce the cost per M. cubic feet sold.

Case III.

For this comparison there will be considered distribution systems, in both high and low pressure, of

ten square miles each with dimensions of 5 x 2 miles, at distances of one, three and five miles from the plant, respectively. In the high pressure system, there will be a regulator at each six-inch main, and in the low pressure system, one at each twelve-inch main crossing the transmission line. These regulators might well be omitted from the high pressure system as their use is not necessary, but may be desirable, but where installed they must be set at not less than twenty pounds per square inch at the outlet when the consumers on the system approach a figure of 200 per mile of main, for that pressure will be required at the peak hours. In the low pressure system, they will, of course, be necessary in order to reduce the pressure of transmission from pounds per square inch to the desired pressure in inches of water column. The transmission line will be continued through the distribution system in all cases of the same size as that from the plant in order to obtain the greatest efficiency in delivery from the initial pressure.

In this comparison the costs are all calculated as in Case II. and only the length and size of the transmission line will vary for the different distances from the plant.

Results Obtained

As before, the high pressure line is the cheapest in the low densities of consumers per mile of main while the ten-pound line is cheaper than the three-pound one. The two low pressure line curves cross when the consumers per mile of main number a little less than 170 and they also cross the curve showing high pressure costs at the same time when the sales are 40,000 cubic feet, per consumer per year.

With sales of 50,000 cubic feet the same order follows, except that the curve for the three-pound line drops below the curve for the ten-pound line at a consumer density of 115 per mile of main. The three-pound line crosses the high pressure curve when the consumers are 150 to the mile of main and the high pressure curve is crossed by the ten-pound curve after 165 consumers per mile of main are on the system.

Long Distance Gas Transmission

With the gas industry striving for greater efficiency in all departments, the abandonment of small gas plants in separate communities and the supplying of their gas wants from a central efficient plant has proven profitable in many instances.

This opens up the question of the cost of long distance transmission so that the greatest length at which it will be economical may be determined. Such a question becomes very much involved at the outset and even a cursory examination will convince that there can be no figure set as the economical limit for all conditions.

Any proposition to supply gas by a long transmission line must enter competition with other fuels and with the alternative proposition of supplying gas from a plant located at the district to be supplied. A figure for cost which could not be exceeded in one case might be possible of considerable increase where cost to operate a local plant would be high.

By combining the costs shown by the curves in the various figures for transmission and distribution together with the costs for either high or low pressure holders, it should be possible to work out a close approximation of the costs of transmission and distribution for all conditions within the limits of average operation today.

Conversion to High Pressure

The problem today on most gas distribution systems which have been operating for several years, is to increase their capacities. In some cases this need of increase is pressing in order that the growing demands, due to increased density in consumers per mile of main, be supplied. In other instances, regulation by Public Utility Commissions is demanding more uniform pressure at the consumers' premises than has been the practice. In either event, the capacities of the distribution mains must be increased materially.

Subdivisions of Problem

As a rule, this problem resolves itself into two subdivisions as follows: First, the supply to the district or section affected is inadequate, while the distribution mains are ample in size; in the second case, the distribution mains themselves are not of sufficient size to serve the demands on individual streets without undue drop in pressure at the points most remote from the feeder mains.

In the second instance, the supply may or may not be adequate, but the first problem is to so strengthen the distribution mains that the pressure will not vary excessively at the consumer's premises. The chief obstacle in the way of increasing the distribution main capacities is the street surface which is almost certain to have been laid since the installation of the gas mains. The mains when laid were probably thought to be of adequate size for any demand which would be made of them, or if changes to increase their capacities were looked forward to it was probably firmly believed that the costs for the improvement would not increase in anything like the proportion which they have. As a result of this rise in prices any increase of distribution main capacities by replacing with larger mains means multiplying the investment in mains in the districts affected by not less than three and often by more. Any new mains put in as replacement would be of greater size than the original mains; pipe costs have advanced by nearly 100 per cent from what they were fifteen to twenty years ago. The labor for their installation has advanced in like proportion, while the street improvements which are now covering the mains complicate the situation further. Some relief may be obtained by tying in mains, if it has not already been done, and by running mains on streets which might be called "side streets" on which no consumers face, to equalize pressures and it may be possible to postpone for a time the inevitable. It may become

necessary to lay a new and larger main on each street in the territory where the supply is inadequate. The expenditures attendant upon this, in some cases, would be impossible were the areas affected a large proportion of any company's property.

Raising the Pressure

An alternative to the laying of new mains is the raising of pressure in the present mains; there is, of course, a very definite limit to this if individual regulations are not installed ahead of the consumers' meters, for were the pressures to be raised to the point which would supply the consumers theretofore suffering from inadequate supply, the consumers near the feeder mains would be receiving pressures far too high for meter accuracy or safe operation. However, if individual regulators are installed the pressures may be raised practically without limit.

If it is known that the mains are in good physical condition and such as to withstand, without an undue high leakage resulting, pressure of a few pounds per square inch, it may be that the most economical way to obtain the desired increase in capacities will be to convert the district to high pressure or a modification of it which may be called semi, medium or intermediate high pressure. These terms are widely used in connection with systems operating under pressures from ten pounds per square inch down. Should such a scheme of converting to high pressure be decided upon, the question of a feeder to the district must be settled; it may be feasible both from the operating and cost standpoints to convert one of the existing lines from the plant to high pressure. It could continue to act as a feeder for any low pressure mains supplied by it, only the installation of district regulators being required to reduce the pressure to inches of water column. Or it may be advisable to lay a new line designed for high pressure. Such a conversion of an existing line need not be permanent and it might well be done in some instances in order to make possible the postponement of capital expenditures to more favorable times.

Effect of High Pressure on Complaints

A comparison of the number of complaints per unit of consumers on high pressure and low pressure systems will throw more light on the results obtained from the two methods of distribution.

It has long been known that companies operating high pressure systems have fewer complaints in proportion to the number of consumers served than do companies operating under low pressure. Comparison of the complaints per unit of consumers as shown by the different companies, even when operating under the same conditions, is often not productive of results of any value for the reason that, in many cases, the number of complaints does not depend so much on the character of service rendered as it does on the character of service to which the consumers in the respective districts have become accustomed.

Effect of High Pressure on Meter Performance

Meter repairmen have often commented on the difference in condition of gas meters brought in for repair from high pressure and low pressure districts. This comment has always been to the effect that meters from high pressure systems were consistently in better shape than those from low pressure systems.

Hoping to obtain more definite information than that conveyed by the impression of individuals, an investigation was made of the records of a company operating both high and low pressure systems.

This information was rather difficult to obtain for the reason that the practice of keeping meter records, which could be broken down to give the data desired, has been in operation for only a few years and, therefore, any conclusions based on the information obtained from it is not as definite as it will be several years hence, when the meters will have served for a greater period and will have, in some cases, broken down, and in others been repeatedly repaired.

Sufficient data is available, however, to allow at least comparative conclusions to be drawn and such comparative conclusions should be of such value as to warrant their serious consideration should the matter of high and low pressure systems from this standpoint ever be up for study.

Any effect on meter performance would probably be reflected in three ways: first, in the length of time a meter may remain in service; second, the extent of the repairs necessary to restore the meter to proper condition when it is brought in; and, third, the accuracy of the meter.

The meter performance on both high and low pressure was investigated for these points, and generally the records disclosed that meters measuring gas which had been compressed, whether distributed at high, semi high or low pressure, remained in condition longer, required less repairs on being brought to the shop and were more nearly accurate than the meters used for straight low pressure distribution.

Effect of High Pressure on Unaccounted-for Gas

While the term "leakage" is the one usually used to designate the gas which is made and sent out from the plant, for which the companies are not paid, it is becoming more generally the idea to consider it as unaccounted for. This is undoubtedly the proper terminology, as it is well known that only a portion of the gas which has been called leakage is lost into the atmosphere through leaks.

There are many factors influencing the size of the unaccounted-for gas figure that in no way affect the amount of actual leakage. A few of them are listed as follows:

1. Errors in Station Meters.
2. Errors in Consumers' Meters.
3. Accuracy of Reading Consumers' Meters.
4. Correction for Temperature and Pressure.
5. Condensation.
6. Losses Due to Blowing Drips.
7. Losses During Construction Work.
8. Stolen Gas.

Of the above, none of the factors with the possible exception of the last, can be considered as affecting in any way the amount of gas lost through leakage, and all but the last one are susceptible of determina-

tion within fairly close limits and for them correction factors may be made. The difference between the gas sent out and accounted for would be affected by all of them alike, whether high or low pressure were used, and it would be better to eliminate such factors as those listed above when comparing this unaccounted-for gas for any number of systems, whether distributing at the same or different pressures.

It would be well also to express the leakage or unaccounted for in terms other than percentage of the sendout, as any figure of this sort is so influenced by the sales as to distort the actual loss per unit of mains when comparing two systems whose sales per unit of main are at wide variance. Probably the mains should be reduced to some common diameter, as has been done already in some instances in order to make the figures more comparable.

Real Factors Involved

To continue the list: the following factors are the real contributors to that portion of the unaccounted-for gas which is really leakage:

9. Actual Leakage from Holders.
10. Actual Leakage from Transmission Mains.
11. Actual Leakage from Distribution Mains.
12. Actual Leakage from Service.

Of these the first will remain the same whether the distribution is by high or low pressure; the others should increase with the increase in pressure on the system, and probably all but a very small percentage of the leakage will be from those structures mentioned in the last three items.

A study of the unaccounted-for gas on the Pacific Coast during the past two years has confined nearly all of the leaks to the mains and services, including with the services the consumers' meters and regulators and their connections; with the mains and meter installation the greatest offenders.

Going into the question of leakage from mains, it is found that practically all of the leakage which is due to leaks so small that they exist for considerable time without discovery, is caused by defective joints, lead joints on cast iron mains, gaskets in couplings of the Dresser type and defects in screw couplings or pipe threads. Such leaks should be eliminated by the use of properly designed joints, and as the leakage reported in the above study was prevalent on low pressure mains as well as on high pressure, there is pressing need for change in both systems. Leaks due to corroded pipe are surprisingly low in most cases and by proper protection to wrought iron and steel pipe could be reduced to a minimum. Leakproof joints can be made and pipe adequately protected so that leakage from mains properly laid should not increase unduly with high pressure.

To one who has not made, or caused to be made, a careful inspection of meter installation at consumers' premises, the amount of leakage to be found there and easily remedied will be surprising. It would seem that any perceptible leak around the meter installation would become so obnoxious, particularly at night when the air is still, that the consumer would promptly report it. Such is far from the case, however, in a great many instances, and there are companies which have very materially reduced their unaccounted-for gas by conducting a house-to-house inspection and elimination of leaks. Leaks up to twenty-five cubic feet per hour have been found by inspectors at domestic consumers' premises, no report of which had been made by the consumer. Larger leaks have been found at industrial consumers' installations. Leaks found in meter installations, unless ahead of regulators, would be the same for low or high pressure.

From this it is easy to see that with a high pressure system designed for high pressure, the leakage on a well operated property should not be seriously greater than for low pressure.

Loss in Thermal Content Due to High Pressure

Any discussion of high pressure distribution omitting consideration of loss in thermal content of the gas due to compression would be incomplete indeed, for there is so great an objection to the use of high pressure on this score alone, by some engineers, that it must be included.

Nowhere in this paper has there been used a pressure greater than sixty pounds per square inch, and as this pressure is the upper limit of the pressures used in several instances where accurate data on the subject of B.t.u. loss is concerned, there will be included here no information as to pressures higher than sixty pounds.

The B.t.u. value as shown in all of the following tabulations are results of calorimeter tests on gas collected by means of continuous sampling tanks operating from twenty to twenty-four hours per day, and are, therefore, truly representative of average conditions.

This information is from records on oil gas only, but it is not likely that the losses for coal gas for the same or comparable original thermal content will be any greater. Such evidence should be conclusive proof that high pressure operation within the limit prescribed is not productive of serious loss in thermal content.

	Plant A	23 miles to	B	Avge. pressure at A
B.t.u.	561		556	55 pounds
	Plant C	23 miles to	D	Avge. pressure at C
B.t.u.	551		550	35 pounds
	Plant E	25 miles to	F	Avge. pressure at E
B.t.u.	550		547	60 pounds

Conclusion

It will be apparent to anyone reading this paper that, as pointed out in the foreword, the treatment of the subject of high pressure transmission has been but general. To follow out in detail the several subdivisions mentioned here would entail a great amount of time and labor, but the resulting information would be of great value to the gas industry. It is certain that such will be done some time, but by whom and when remains for the future to determine.

There are systems of such a size and whose amount of business is such that the costs shown by the curves make the choice between high pressure and low pressure easy, for in their cases the difference between the costs of the two methods will be great enough to at once preclude the method showing higher costs. In other companies, the line between the two will not be so well defined and a closer study of some, or all, of the phases may become imperative. When the actual conditions are known this should not be difficult.